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FIRE ALMANAC

The complete information book on fire

For every fire fighter, fire protection engineer,
fire buff -- everyone interested in fire & fire safety

Up-to-date facts, figures, lists, references;
tables, graphs, histories, contacts & services

**It's all here
in one convenient source!**

THE
1983
FIRE
ALMANAC

NFPA®

National Fire Protection Association
Quincy, Massachusetts 02269

The National Fire Protection Association is a non-profit technical and educational organization. Its mission is to promote the science and improve the methods of fire protection and prevention; to obtain and circulate information on these subjects; to secure the cooperation of its members and the public in establishing proper safeguards against loss of life and property by fire.

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INVITATION TO THE READER

We hope you will find this *1983 Fire Almanac* a useful and handy one-stop reference for information about the fire protection field. We've tried to make this first edition as complete as possible, but we need your help to make the next edition of *The Fire Almanac* even more comprehensive.

If there is information or a subject that we didn't include, but you would like to read about or know about, tell us what it is and we'll try to include it. If you know something that should be included in this book, or have something interesting about the fire protection scene that you want to contribute, please let us know. Write to: Editor, *Fire Almanac*, National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

We also want to know if a name, an address, or a phone number has changed, if there's an upcoming event, a new program or course, a new publication being offered. If you have more current information than is contained in this *Almanac*, or have found misinformation or major omissions, please let us know. We will be sure to correct the errors and provide what is missing in the next editions. We'd also like to know what you liked most about *The 1983 Fire Almanac* and what you disliked or found unnecessary.

This *Almanac* is published *for you*—we want you to help make it as useful and as entertaining as possible. We look forward to sharing your ideas and information in future editions.

Year in Review

The Year in Review — As NFPA Saw It

An almanac is defined as an annual publication composed of various lists, charts, and tables of useful information. We bring you much more in this, our first *Almanac*. We have pulled together the most asked for information on firesafety; the "who's" and the "what's" of fire protection in the United States today. No almanac is ever complete; so, we enlist your support in helping to "fill-in the gaps" for our next edition.

An almanac, by its nature, points to certain trends and phenomena. Firesafety trends in the United States are somewhat encouraging as we look to the declining rate of fire deaths over the past five years. However, we have a long way to go when we compare the United States and Canada to Europe and Japan where the deaths per million population are still one half our fire death rate. To what do we attribute the improvement here in the USA of the last several years? We believe it is due to a new awareness on the part of the general public to the fire threat as well as the widespread use of early warning smoke detection in the home. Over 75 percent of the fire deaths in the United States (and for that matter throughout the world) occur in residences, the places where people live. Our biggest challenge, then, is preventing the residential fire death.

In 1982, hotel fires continued to be a major concern universally, but the trend was most prominent outside the U.S. with several significant multiple fatality fires: the Hotel New Japan fire in Tokyo on February 8 where 32 guests and employees perished; a hotel fire in Alexandria, Egypt in December where at least ten guests reportedly perished; the Atallah House Hotel fire in Riyadh, Saudi Arabia in December in which five guests were killed, and the Kumbo Hotel fire in Taegu, South Korea in which ten perished on December 29, 1982. The worst hotel fire of 1982 in the United States occurred in the Westchase Hilton Hotel on March 6 when twelve hotel guests perished.

The trends of the past few years have prompted major hotel chains to embark on retrofitting programs to install detection, extinguishment, and containment systems in their properties. Automatic sprinkler systems are regarded as one of the most effective life safety systems available today. In 1982, quick-response, low cost, retrofit sprinkler systems for use in hotel occupancies were tested and demonstrated in Ft. Lauderdale, Florida, the latest in a long series of tests and demonstrations of the quick response sprinkler head for residential life safety. This points up another trend, namely, the requirement by municipalities for residential sprinkler protection in communities that are trying to hold down the cost of maintaining public fire departments. This type of requirement has been pioneered in San Clemente, California, and Scottsdale, Arizona.

Some old, very familiar problems came back in 1982 to haunt the fire protection community. We are reminded of the old saying "Those who ignore history are doomed to repeat it." We have in mind the April wood shingle roof conflagation in Anaheim, California, and the June K-Mart Warehouse and Distribution Center Fire in Fairless Hills, Pennsylvania. As long as communities tolerate untreated wood shingle roofs, homeowners will continue to lose their homes and fire fighters will continue to be frustrated. The K-Mart Warehouse fire proved, once again, that the storage of large quantities of flammable liquids in the form of aerosols, LP gas cylinders, paint, and motor oil, alongside general warehouse goods will make for a spectacular and rather challenging fire problem

— not to mention the extreme hazard to fire fighters in a warehouse that covers some 25 acres under one roof. The solution is not easily attained and is, perhaps, only achievable through segregation of the flammable liquids from the rest of the merchandise. After all, that is the way we used to do it in the "old days!"

We had a few more jail fires in 1982: 7 inmates were killed in the Hudson County Jail in New Jersey in April, and another 29 inmates were killed in the Harrison County Jail in Biloxi, Mississippi in November. Probably one of the most unusual fires in 1982 was the Caldecott Tunnel fire in Oakland, California in which a gasoline tank truck ruptured after an accident and the ensuing fire killed seven people.

On the federal scene, 1982 saw Reagonomics hit the federal focus on fire particulary hard — to the point where the focus nearly disappeared. The United States Fire Administration (USFA), with only a brief seven year history and well short of its 50 percent fire loss reduction goal, almost went out of business. The USFA was saved only through the combined efforts of the several interested fire service organizations comprising the Joint Council of National Fire Service Organizations along with several concerned members of Congress. Saved was a 4.1 million dollar budget and 20 staff positions to be co-located at the National Emergency Training Center along with the National Fire Academy. Not as widely publicized was the attempt to dismantle the Federal Fire Service which employs some 20 to 30 thousand civilian fire fighters working for military and other government fire departments throughout the world. The military bases were required to provide for competitive bidding of the fire department services by private contractors. Again, because of Congressional concern, there has been a delay into 1983 to implement this change.

In other trends, the U.S. government is once again looking to the private sector to develop firesafety standards for its use in purchasing specifications as well as regulations. The OMB Circular A119 requiring federal agencies to participate in private sector standards making and to utilize private sector developed standards was issued in late 1982. In the Department for Housing and Urban Development, they are looking for the private sector to develop, once again, the mobile home construction and safety standards which had been a private sector responsibility prior to 1976. With the failure of the Federal Trade Commission to issue a report and recommendations for the regulation of private sector standards making organizations and with the OMB Circular, it appears that the 1980s will see the continued and renewed use of both NFPA Standards and those of other organizations by the U.S. federal government.

Probably the most controversial subject in U.S. fire protection today is the toxicity of the products of combustion of the materials that are used in our built environment, both man-made and natural. The decisions that will be made throughout the 1980s in the development of standards, building codes, and regulations having to do with the issue of toxicity of the products of combustion will have far reaching firesafety and financial implications in the United States.

Almost as controversial as the toxicity issue is the subject of alternative heating for American households. We have gone through a tremendous upsurge in the use of solid fuel alternative heating devices, such as coal and wood stoves, with some very dramatic and sometimes disastrous consequences. Basic knowledge concerning clearances of stovepipes from combustible partitions and other materials seems to have been lost in the mad scramble to provide less expensive heating of our homes. The lost art of stoking and dampening coal stoves is being relearned by Americans as coal becomes one of the more economical heating fuels. The latest trend is towards the resumed use of portable kerosene heaters, a type of alternative heating device that was in widespread use several decades ago. The manufacturers of today's devices claim that they are a lot safer than those used by earlier generations. The device itself is not the only concern of fire officials who fear, once again, the threat of fatal fire presented when large quantities of flammable liquids in the form of kerosene are stored in and around the home. Another form of alternative heating device that is trying to penetrate the American scene is the so-called "cabinet heater," a device widely used in Europe that contains a supply of fuel in the form of an LP gas cylinder. The use of LP gas cylinders in places of human occupancy has, historically, been banned in the United States because of the potential BLEVE hazard.

As we close out the 20th century in the remaining two decades, we are experiencing and will continue to experience certain political and financial constraints in the delivery of fire protection services in the United States. The "signs of the times" provide indicators for what we might expect in the future. While the pressures of inflation are driving the costs of fire protection ever upward, the American citizen has at the same time declared a tax revolt which has put a lid on government spending at all levels. The fire service and the fire protection community in America have no choice but to find more cost effective approaches to delivering firesafety to the public.

In the next twenty years, the fire service will be considering new, as well as time-proven, steps to achieve these cost effective goals. There will be increased consolidation of fire departments and similar functions within municipalities. Functional consolidation will be much more widespread and will include central purchasing, central dispatching and alarm services, and the pooling of training, fire prevention and EMS services. An increase in the number of private contractors hired for fire prevention and fire suppression services to the municipalities and probably to the federal government could replace some of the more traditional governmental approachs to public safety. Better utilization of manpower, increased productivity, a cost conscious citizenry, and management hardened fire chiefs will be the watchwords of the next decade. There will be an increased awareness of the fire problem by all citizens and, consequently, an increased awareness of the cost burden created by the fire problem.

We see a more equitable distribution of the cost of public fire protection in the years to come so that the homeowner is not paying for the protection of high-rise buildings in his tax bill. Traditional tax exempt properties will be scrutinized to make sure that these institutions are paying their fair share for public services. All forms of new revenue sources will be explored by the fire service as they look towards alternative means to support their mission.

The closing decades of the 20th century will see the installation of automatic fire detection and suppression systems in office buildings, hotels, restaurants, and other commercial occupancies, both new and old, because the fire departments of the future will be even less able to provide the resources to combat fires in these structures.

Building firesafety will be improved with new, computer-aged tools available to the fire protection engineer. We will be able to predict, rather accurately, the effect of fire scenarios in just about any given structure before the building is built or when existing structures are analyzed for life safety. We will, hopefully, be able to better understand complex issues, such as human behavior in fires and the toxicity of the products of combustion.

And finally, we predict the fire protection community (throughout the world) will meet the challenges of the 21st century with dedication, determination, and skill. We hope that this *Almanac* will be used as an important tool in the better understanding of the fire problem today by those who are trying to do something about it.

Significant Fires of 1981-82

Hutchinson Wharf Building

Lynn, MA
Nov. 28, 1981

A fire which started in the partially demolished eight-story Hutchinson Wharf Building in Lynn, MA on Nov. 28, 1981, spread quickly to adjacent buildings, then swept across streets to neighboring buildings.

Conflagration, Lynn, MA, Nov. 28, 1981. (Lynn Item, Lynn, MA)

The fire caused an estimated 70 million dollars in damage, totally destroyed 20 buildings and damaged 11 others, affected some three dozen firms and left more than 800 persons temporarily without jobs. Many of these buildings were constructed at the turn of the century and were historically significant to Lynn's emerging renaissance under the guidance of the Office of Economic Development. With the help of federal funding programs the area was partially restored for residential and industrial use with additional plans for industrial, commercial, educational and recreational development. These plans were terminated by the fire.

Over 700 fire fighters from 74 communities, manning 95 engines, 29 ladder trucks and other special equipment fought the fire. The closeness of the buildings allowed the fire to extend both through radiation and direct flame contact. The narrowness of the streets, the threat of collapsing walls, and the intense heat made outside sprinkler connections inaccessible and prevented the fire fighters from taking effective positions to protect exposures. High winds which reached gusts up to 39 miles an hour combining with thermal up-drafts generated by the fire, contributed to the spread of the fire. Flying brands ignited fires in structures over ¾ of a mile away.

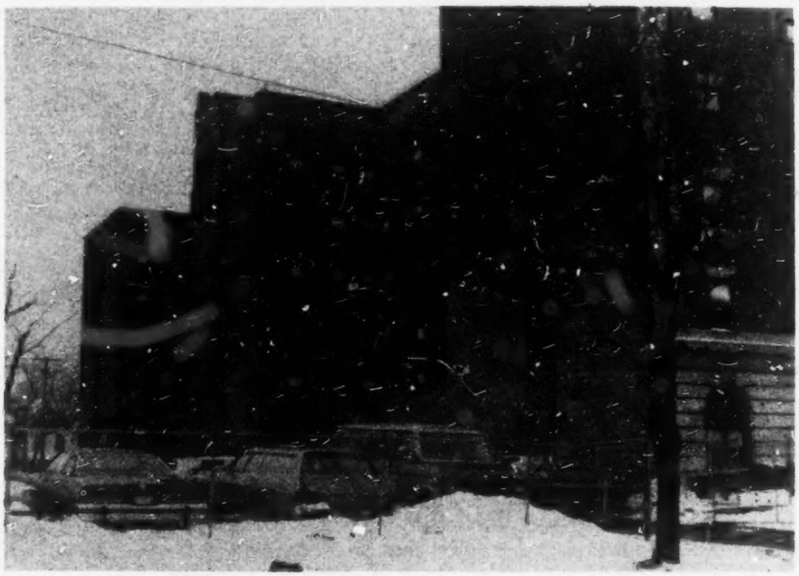
While 25 ladder pipes and 40 other heavy stream appliances were used at the height of the fire, no significant water supply problems were experienced. Collapsing buildings severed sprinkler supply lines causing some water loss; however, adequate volume and pressure were maintained. Water for fire fighting from the domestic water system was supplemented by salt water pumped from Lynn Bay by four engines to companies at the fire.

Although some communication problems were experienced on the fireground, calls for additional men and equipment were transmitted with little or no confusion through six communication control centers.

Rockefeller Park Towers

Cleveland, OH
Jan, 5, 1982

A fire in the Rockefeller Park Towers, a residential apartment building housing mostly elderly residents, in Cleveland, OH on Jan. 5, 1982, was responsible for the deaths of five of the occupants and injuries to 17 others, including three fire fighters, one of whom



Rockefeller Park Towers, Cleveland, OH, Jan. 5, 1982.

sustained serious injury. The cause of the fire, which occurred at 8:00 p.m., was determined by local investigators to be electrical. The fire required the evacuation of 180 mostly elderly residents, 50 of whom were removed over fire department aerial ladders, carried on stretchers, or led from the building by fire department personnel. The fire department reported that many of the occupants were blind, handicapped, or had ambulatory problems that required their using wheelchairs. Significant removal efforts by the fire department resulted in some delay before the building was totally evacuated.

Factors contributing to the fatalities in this fire were:

- Delay in notifying occupants (after initial discovery) of the developing fire through the use of the building's manual fire alarm system. The delay was primarily caused by an attempt by residents to extinguish the fire, and
- Failure of an apartment corridor door to close, allowing the fire and products of combustion to enter the third floor corridor. This resulted in rapid deterioration of tenable conditions in the exit access corridor.

Dwelling Fire
Hanover, MA
Feb. 7, 1982

An early morning fire in a large, 2-½ story, newly-renovated home claimed the lives of a mother and her 14-year-old daughter. Two other younger children escaped safely.

A smoke detector awakened the oldest daughter who woke her mother and younger brother and sister. The father and three other children were away on a skiing trip at the time of the fire. All four family members who were home left the single-family home safely but the older daughter returned to her room. The mother also re-entered the home in an attempt to rescue her daughter. Both mother and daughter died in the fire. The mother was found at the top of the stairs. The daughter was found in her bedroom.

There were three single-station, battery-operated, ionization-type smoke detectors in the house, two on the second floor and one on the first floor. Two detectors were at the top of both stairs on the second floor. The third detector was at the bottom of the rear stairs in a hall or dining area. After the fire, the father claimed that all three smoke detectors were in working order prior to the fire. The family had practiced exit drills according to the Hanover fire chief.

The cause of the fire was determined by the State Fire Marshal's office to be electrical in nature. The area of origin was a crawl space beneath the first floor kitchen at the rear. The house was sufficiently damaged by the fire and was subsequently razed. The three smoke detectors were severely damaged in the fire. It could not be determined if all detectors were operational at the time of the fire.

Hotel New Japan

Tokyo, Japan
Feb. 8, 1982

An early morning fire on Feb. 8, 1982, in the Hotel New Japan, Tokyo, resulted in the deaths of 32 guests and injuries to 28 others, including four fire fighters. There were 316 guests registered at the hotel and 31 employees in the building at the time of the fire.

The hotel complex, built in 1957, was a 10-story building having two sub-surface basements and a four-story machinery penthouse. The complex had mixed occupancy, the first three floors contained restaurants, offices, function rooms and a parking garage. Hotel guest rooms were located on the fourth through tenth floors.

Fire protection for the building included: fire extinguishers, standpipe systems with hose for occupant use and outlets for fire department use. Further, there was fire detection equipment on all floors and automatic sprinkler protection on the 1st, 4th, and 7th floors. (The building was in the process of being fully protected by automatic sprinklers.) Fire detection equipment consisted of smoke detectors in the stairwells and combination rate-of-rise, fixed temperature detection equipment in guest rooms. Also, there was a fire

Hotel New Japan, Tokyo, Japan, Feb. 8, 1982. (Associated Press) alarm system with a voice evacuation notification system. Finally, there was a building firesafety control center (typical of the Japanese concept of fire protection) within the building. Apparently, the fire detection equipment and the public broadcasting equipment did not function at the time of the fire.

The fire department received three calls notifying them of the fire - two from people outside the building and one ten seconds later from the front desk. The first arriving company found flames visible through windows on the west side of the 9th floor, spreading to the 10th floor. Investigators believed that the fire started on the 9th floor; however, the cause of the fire is still under investigation. Sixty-six people were rescued by the fire department - 22 over ladders, 11 by rescue rope and 33 by stairs.

Employees attempted, unsuccessfully, to extinguish the fire. They were able to guide some guests on the 9th and 10th floors to the elevators and stairways. All the doors to rooms on the 6th through 9th floors were opened to inform guests of the fire. Although the operator phoned all rooms, only one occupant answered. The emergency broadcast system was used, but did not work.

The rapid spread of fire was attributed to the interior finish of plywood veneer and the fact that the room walls (concrete blocks) did not extend to the underside of the floor above, but terminated at the ceiling. Above the ceiling there was an open, undivided "attic" area on each floor which extended from one end of the building to the other without fire dividers. There was no protection between the rooms and the corridors' ceiling areas. Holes around the piping allowed the fire to spread upwards. The fire extended past the 8th and 7th floors and reappeared in a small area on the 6th floor.

Factors contributing to the large loss of life include: a zone alarm installed in the main alarm system did not work and broadcasts of emergency announcements were not heard; lack of training resulted in appropriate immediate action not being done; the majority of the guests were foreigners thereby compounding communications; and the rapid fire growth and smoke spread.

The fire department had ordered the building owner to install a complete automatic sprinkler system and fire alarm system tied into the fire department but compliance was "very slow" because of the marginal financial condition of the hotel.

The fire destroyed over half of the 9th floor and two-thirds of the 10th floor. There was also partial damage to the roof and the 7th floor.

Westchase Hilton Hotel

Houston, TX
March 6, 1982

On March 6, 1982, an early morning fire in the Westchase Hilton Hotel in Houston, TX, resulted in the deaths of 12 hotel guests and serious injury to three others. The fire, which was reported to the Houston Fire Department at 2:25 a.m., occurred in a guest room located on the fourth floor of the hotel's 13-story high-rise tower. The fire involved mainly the contents of one guest room, and exposed the fourth-floor corridor to severe heat and smoke conditions. Due to the building configuration, the fire was also able to extend horizontally to two adjoining rooms on the fourth floor. In addition, there was minor vertical exterior fire extension to three guest rooms on the fifth floor. Smoke was able to spread throughout the fire floor and, to varying degrees, to all levels of the building.

All of the fatalities were occupants of the fourth floor, the floor of fire origin. Nine persons from two separate families occupying three fourth-floor rooms were among the 12 fatalities. Another occupant of the fourth floor died while attempting to escape and was found in the smoke-filled fourth-floor exit corridor. Two other fourth-floor occupants, rescued from the building by fire department personnel, died after hospitalization.

Major factors contributing to the loss of life include:

- Lack of detection and extinguishment of the fire in the incipient stage.

Westchase Hilton Hotel, Houston, TX, Mar. 6, 1982.

- The guest room door of the room of origin did not close completely contributing to the severe heat and smoke exposure to the fourth-floor corridor and other guest rooms.
- The lack of an evacuation alarm in the early stages of the fire to alert guests on the fire floor.

Caldecott Tunnel

Oakland, CA
April 7, 1982

A collision involving a tank truck carrying 8,800 gallons of gasoline occurred in the Caldecott Tunnel, Oakland, CA, resulted in the deaths of seven people and injury to two others. The accident occurred shortly after midnight, April 7, 1982, when a transit bus (carrying no passengers) swerved into the lane occupied by the tanker, to avoid hitting a stalled automobile. This action caused the tank truck to jackknife and the trailer to overturn and rupture. Within a short period of time, ignition occurred that soon resulted in the violent burning of the product.

The Caldecott Tunnel runs east to west and is approximately 3,400 feet long. The tunnel is a major commuting route to San Francisco from Contra Costa County. The tank truck was midway through the tunnel when the accident occurred. Winds from the west at the time of the accident probably affected the direction in which the products of combustion were able to vent. All of the fatalities were located behind (to the east of) the tank truck. Some persons were able to escape before the fire had spread through the tunnel. Because the incident occurred late at night, when traffic was extremely light, the number of fatalities that occurred from this incident was limited.

The intense heat from the fire caused severe spalling of sections of the concrete wall and ceiling assemblies and the road surface in the immediate area of the tanker. The heat also caused damage to equipment, etc., within approximately 1,700 feet of the tanker and the fire consumed six vehicles caught within the tunnel.

An early effort to promote fire prevention awareness to the public occurred in 1915 when Portland, Oregon developed what was believed to be the first city-wide fire prevention bureau. Fire fighters instructed schools and civic groups on identifying and eliminating fire hazards in the home.

Hudson County Jail

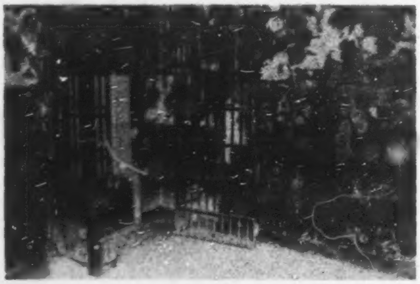
Jersey City, NJ
April 16, 1982

An early morning fire on April 16, 1982, killed seven inmates at the Hudson County Jail in Jersey City, NJ. All fatalities occurred in one dormitory-style cell on the top floor (the floor of fire origin) of the eight-story building.

The building is of fire resistive construction but has no automatic detection or suppression equipment and no standpipes. There was a local fire alarm within the building and a direct line to the fire department on the first floor.

The fire apparently began in a polyurethane mattress in the cell where all the fatalities occurred. This dormitory cell housed inmates with emotional or mental adjustment problems. The fire was confined mostly to the cell of origin and its bathroom, but smoke was able to spread throughout the floor of origin.

The characteristics of this fire coincide with previously identified fire problem areas within prisons: ignition and fuel controls within the occupancy (i.e. smoking materials), and highly combustible furnishing materials (i.e. padding for cells and mattresses). Further delays in discovery, evacuation, and alarm were noted by investigators.



Hudson County Jail, Jersey City, NJ, Apr. 16, 1982.

Anaheim, CA Apr. 24, 1982.

Conflagration — Anaheim, CA

April 24, 1982

An early morning fire, driven by 45- to 50-mile per hour Santa Ana winds, destroyed 51 buildings in Anaheim, CA, on April 21, 1982. The buildings included commercial structures and single-family residences and apartments. Almost 500 dwelling units were damaged or destroyed and 1500 people were displaced.

WE WANT TO KNOW . . .
if a name, an address, or a phone number has changed; if there's an upcoming event, a new program or course, a new publication being offered. If you have more current information than is contained in this *Almanac*, know something that should be included in this book, or just have something interesting about the fire protection scene that you want to contribute, please let us know. Write: Editor, *Fire Almanac*, NFPA, Batterymarch Park, Quincy, MA 02269. All suggestions will receive our careful attention.

The fire was considered to be the worst in Anaheim or Orange County history. Numerous apartment complexes were totally destroyed. Other apartment buildings were severely damaged with roofs burned off or with the roof and top floor destroyed leaving the first floor undamaged by fire. One apartment building with a composition roof in the direct path of the fire was not damaged. A preliminary estimate of damage was $50 million.

There were no fatalities resulting from this fire. Several residents suffered minor injuries, two had heart attacks. Six fire fighters suffered from heat exhaustion and smoke inhalation.

The City of Anaheim applies and enforces current editions of the Uniform Building Code and numerous additional standards pertaining to building and firesafety. A 1976 administrative order addressed the wildland fire hazard in brushland or watershed areas of Anaheim, requiring listed fire-retardant Class C or better roofing material, protection of exterior walls, horizontal surfaces and openings, and spark arrestors. This fire occurred in the "flatland" area not covered by the 1976 administrative order. Untreated wood shakes and shingles were permitted in the flatland area.

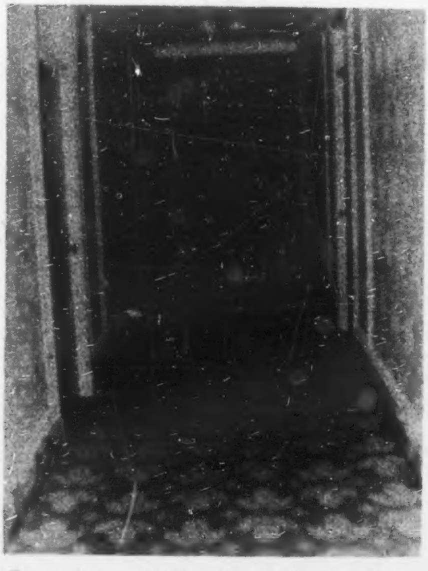
Preliminary information indicates that rapid fire spread was due solely to untreated wood shingles or shake roofing and dried palm tree fronds in combination with high winds.

Conrad Hilton Hotel

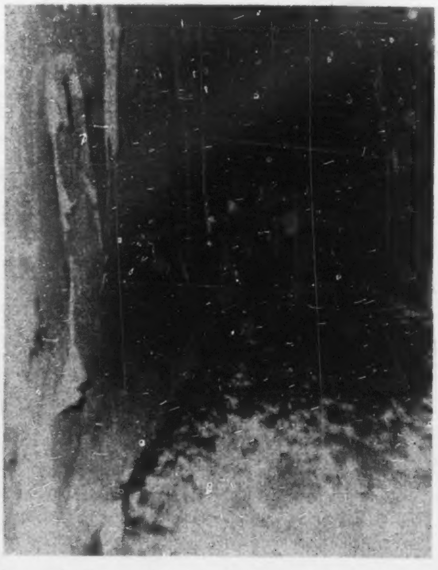
Chicago, IL
May 23, 1982

On May 23, 1982, a fire at the Conrad Hilton Hotel in Chicago resulted in the deaths of four guests, injuries to 23 guests and fire fighters, and up to 1 million in damages.

The hotel, the world's third largest, consists of 25 stories and is part of a complex covering three-quarters of a block. It was built in 1927 and is of fire resistive, steel and



Hallway of Conrad Hilton before the fire. (Chicago Fire Department)



Same hallway of Conrad Hilton Hotel after the fire. (Chicago Fire Department) concrete construction. The attached four-story public assembly building, separated from the main building by fire doors, was the only part of the complex protected by complete automatic sprinklers. There were approximately 4,000 guests in the hotel at the time of the fire.

The hotel had no smoke detectors or audible alarm system — none was required by the city in high-rise buildings constructed before 1975. A manual alarm box on each floor was designed to send a silent alarm to the front desk and the hotel's engineering department. However, the system could not meet *Life Safety Code®* requirements for a manual fire alarm system. The hotel has a standpipe systems located in stairways providing connection for fire department use at floor landings. There were no smoke barrier doors to divide the 1,200 foot exit access corridors.

The fire was discovered shortly before 9:00 a.m., when an occupant returned to his 22nd-floor guest room accompanied by hotel security personnel since he wished to retrieve his room key. Approaching the room, they noticed smoke coming from the room and on opening the door found the mattress flaming and the room unoccupied. The hotel employees alerted the fire department and tried unsuccessfully to contain the fire with a fire extinguisher. Desk personnel began alerting guests by telephone until the fire department arrived. Most guests on the upper floors became aware of the fire by other means.

Suppression crews from the first arriving company were being positioned when the room fire reached flashover and began to spread over their heads, engulfing the hallway. Thick smoke filled the hallways on the floor of origin and soon spread throughout the upper floors.

The four fatalities were found on the fire floor. Three were in two rooms with open doors and one victim was found by fire department personnel in the exit access corridor. Three of the victims were only 10 or 15 feet away from an exit. Most of the occupants of the upper floors who escaped used the outside fire escapes. A few were rescued from the roof by helicopters.

The fire was reported to have been caused by careless disposal of smoking materials which ignited the mattress. The fact that the room door was almost burned through indicated that the fire started nearly an hour before it was discovered.

K Mart Warehouse and Distribution Center

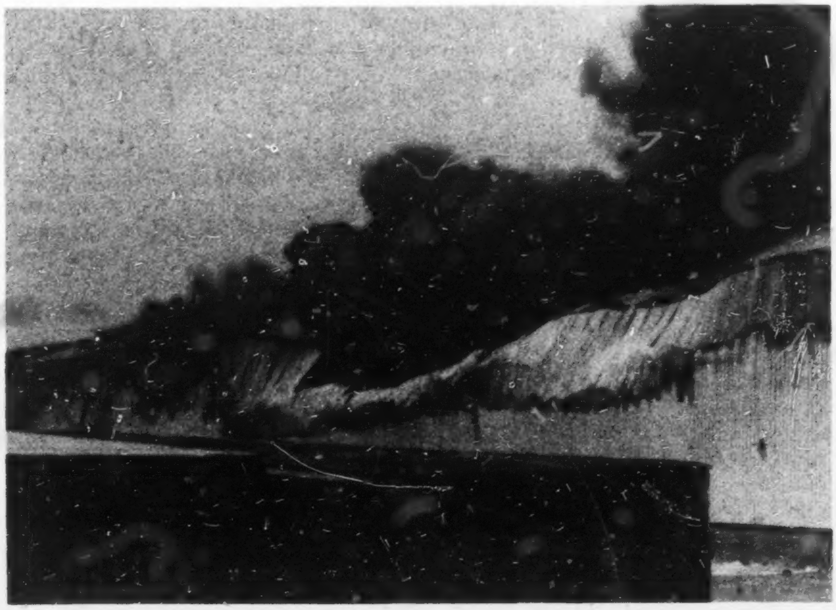
Fairless Hill, PA
June 21, 1982

A completely sprinklered warehouse and distribution center for K Mart stores was totally destroyed by fire on June 21, 1982. The 1,200,000 square foot facility was one story of noncombustible construction, and subdivided into four quadrants by fire walls. The sprinkler systems for the building were hydraulically designed (calculated), supplied from a 300,000-gallon storage tank on site and public water. A diesel-driven fire pump and electric booster pump fed into a 12-inch fire protection loop around the warehouse.

Other fire protection features included heat and smoke roof vents with a vent ratio of 1:96. Openings in the fire walls were not protected with fire doors; instead, deluge type automatic sprinklers provided protection.

This warehouse was utilized as a receiving and distribution center for all K Mart retail stores from Maine to Virginia. The goods consisted of foodstuffs, hardware, automotive products, foam cups and plates, plastic toys, water, alcohol and petroleum-based aerosols, personal care products, propane torch kits, paper products, butane lighter fluid, household items, automotive and bicycle tires bundled onside of pallets, major appliances, etc.

The fire was first detected in one quadrant of the building when a forklift operator heard a noise behind him, followed by a hissing sound. He turned to discover flames involving an area where aerosol containers were stored. The fire developed rapidly



K Mart Warehouse destroyed by fire, June 21, 1982. (Falls Township Fire Department)

despite employees' attempts to control it and the activation of the sprinkler systems. The fire department reported that they saw flames through the roof as they arrived, approximately 15 minutes from the time of ignition. Fire fighters attempted to contain the fire to one quadrant, then to one-half of the facility. The water supply was depleted as the fire progressed and fire fighters were forced to withdraw.

The entire warehouse was destroyed. Preliminary damage estimates exceeded $100 million. Preliminary findings were that all fire protection systems operated as designed but that the hazard of petroleum liquid-based aerosol containers was too great for the level of protection provided. Rocketing aerosol cans spread the fire rapidly, overtaxing the water supplies, and spreading the fire through the fire barriers that divided the building into quadrants. This rapid spread resulted in early roof collapse which broke sprinkler piping.

What Happened in Fire Protection in 1982

Smoke Detectors Protect more U.S. Homes.

By 1982, the number of households protected by smoke detectors broke the two-thirds mark, according to a study by the Federal Emergency Management Agency (FEMA).

The FEMA report, *1982 Survey on Smoke Detectors*, reveals that 67 percent of all households have at least one smoke detector. The use of residential smoke detectors has steadily increased over the last decade. The number of protected households grew from about 5 percent 10 years ago, to 24 percent in 1977, and to 50 percent in 1980.

While the increased use of detectors is encouraging, the report also notes that non-whites and less affluent households lag behind the rest of the country in detector ownership. Only 37 percent of protected households had as many detectors as needed.

Copies of the report are available from the National Technical Information Service, 5285 Port Royal Rd., Springfield, VA 22161.

Beverly Hills Verdict Overturned

The 6th U.S. Circuit Court of Appeals overturned a verdict that cleared aluminum wiring manufacturers of responsibility for the Beverly Hills Supper Club fire, according to United Press International (UPI).

The three-judge panel said that their unanimous decision was "most regretfully" made. The earlier verdict was overturned on the grounds of an experiment on aluminum wiring performed by one of the jurors and communicated to other members of the jury. The case has been sent back to district court for re-trial.

The 1977 fire at the Beverly Hills Supper Club, located in Covington, KY, claimed 165 lives.

Citizens Committee for Fire Protection Established

The Citizens Committee for Fire Protection has been established in Washington, DC.

Among the new group's objectives will be a program to focus national attention on the legal liability of architects, engineers, and builders for fire-related deaths and injuries. Public and private foundations and fund-raising appeals to the general public are expected to provide financial support for the Committee.

Art Delibert chairs the new Citizens Committee.

Academy of Product Safety Management Established

The Certificate Board of Product Safety Management has announced the formation of the Academy of Product Safety Management. The Academy's major function, according to the Board, is to advance the practice of product safety management. Regional chapters and industrial divisions are planned.

Additional information about the Academy and professional certification as a product safety manager is available from the Board of Product Safety Management, 8009 Carita St., Bethesda, MD 20817.

New Directory Published

A Directory of Certified Hazard Control Consultants has been published by the International Institute of Safety and Health (IISH), a professional group based in the suburbs of Washington, DC.

The *Directory* lists certified practitioners in 50 specialty areas of occupational and environmental safety and health. Each listed specialist has been certified by a recognized board or state agency.

Copies of the *Directory* are available from the IISH at 5010A Nicholson Lane, MD 20852.

New Focus, Management Announced for Center for Fire Research

The Center for Fire Research at the National Bureau of Standards in Gaithersburg, MD, has announced a realignment of its programs and new management assignments.

The new CFR structure includes a center headquarters, an Office of Fire Research

Resources, and two technical divisions: the Fire Safety Technology Division and the Fire Research and Measurement Division. Management staff includes:

Center Headquarters

Dr. Jack Snell, Director, is a newcomer to the fire field. He previously served for five years as Director of the Office of Energy Programs and has been with NBS for eleven years. His prior experience includes university teaching and development of a transportation research laboratory. He has degrees in civil engineering, operations research, and aeronautical engineering. Dr. Snell represents CFR on ASTM E-5 and is a member of NFPA.

Dr. Clayton Huggett, Deputy Director, has been with NBS since 1970 and with the Center since its creation in 1974. He has served as Chief of the Chemistry Section and Head of the Office of Extramural Research before becoming Deputy Director. He is an active member of NFPA, serving on the NFPA Standards Council and the newly formed Toxicity Committee. He also holds membership in the Combustion Institute and ASTM. His degrees and experience are in organic chemistry, physical chemistry, and polymer chemistry.

Office of Fire Research Resources

The Office of Fire Research Resources facilities programs the Center performs for "Other Agencies" (primarily other U.S. Government agencies), administers the Center's research grants program, supplies computer and library support. The Center's anti-arson activities are also managed through this office.

Dr. Robert Levine, Chief, was trained as a chemical engineer and is an expert in combustion. Prior to joining the Center in 1976, he worked for 17 years at Rocketdyne Division of North American Aviation on liquid rocket combustion and stability. He joined NASA Headquarters as Chief of Liquid Rocket Technology and worked at NASA Langley Research Center on combustion problems. He has held several offices in, and is a past president of, the Combustion Institute.

Fire Safety Technology Division

The Fire Safety Technology Division plans, coordinates, and conducts research and engineering studies to develop quantitative measures of fire risk and engineering tools to predict the performance of facilities and people in fire.

Dr. Andrew Fowell, Chief, is a mechanical engineer with a background in fluid mechanics and heat transfer research. Prior to becoming Chief of the Fire Safety Technology Division, he served as Chief of the Product Performance Engineering Division at NBS which was associated with the measurement of life and energy consumption of consumer products. He spent sixteen years in the private sector performing research in fluid mechanics, heat transfer and acoustics, and headed a group involved in advanced product development.

The *Fire Risk Analysis Group* focuses its efforts on the development of quantitative means to measure and manage fire risk to people, property, or systems. Estimates of risks are specified in terms such as likelihood of occurrence and quantifiable losses or costs.

Al Gomberg, Head, is a fire protection engineer. Prior to joining the NBS four years ago to work on the analysis of fire data and statistics, he spent thirteen years in fire insurance engineering, research in fire statistics and educational programs, and consulting in building design and fire investigation. For part of this time, he was the NFPA project leader involved in the design of the National Fire Incident Reporting System. Also, he is an instructor in the fire protection program at Montgomery College, MD.

The *Facility Fire Safety Performance Group* focuses on the development of consistent systems of engineering models for predicting the performance of facilities and people in response to potential fire. A primary concern is the time required to escape from a fire and the time required for the fire effects to build to untenable limits.

Harold "Bud" Nelson, heads this group. His experience in fire protection engineering includes five years with the DuPont Chemical Company and seventeen years with the General Services Administration, where he became Director of Accident and Fire Prevention Division. He joined the Center seven years ago and has been involved in the development of systems concepts and the application of firesafety technology to codes and standards. His major achievements while at NBS have been the development of the Fire Safety Evaluation Systems (FSES) for hospitals and board and care facilities. He is the First Vice President of the Society of Fire Protection Engineers and a member of the Underwriters Laboratories Fire Council.

The *Suppression and Extinguishment Group* examines the mechanisms involved in extinguishment and suppression of fires, develops means to evaluate the effectiveness of suppression agents and methods of application, and develops appropriate performance data and test methods.

Edward Budnick, Head of this group, is a fire protection engineer. He had been associated mainly with full-scale testing of the flame spread of a variety of interior finishes for mobile homes and the correlation of this data with the E-84 Tunnel Test and the E-162 Radiant Panel Flame Spread Test. He joined NBS in 1974 after a short period at the General Services Administration (GSA). While at GSA, he was detailed to work on the Commission on Fire Prevention and Control, which published a report to Congress entitled, "American Burning." This report led to the passage of the Federal Fire Prevention and Control Act of 1974.

The *Smoke and Toxic Gas Group* provides an understanding of the rate of production, properties, detection, and spread of smoke and toxic gases from fires and the technical basis for control of these products to enable reduction of the harmful impacts. Included is the development of methods of assessing the hazards associated with smoke and toxic gases in fires.

Richard Bukowski, Head, is an electrical engineer who worked on electrical fire alarms and detectors at Underwriters Laboratories for six years before joining the NBS. During his six years at NBS, he has broadened his experience on smoke detectors. He authorized the "Indiana Dunes Study on Residential Smoke Detectors."

The *Fire Growth Processes Group* provides methods of assessing the components involved in fire growth and extention of fires. Use is made of fundamental work to develop sound practical methods for predicting fire growth with real materials in real situations.

James Quintiere, heads this group and is a mechanical engineer. He came to the Center eleven years ago after a short period with NASA and private industry. Since joining the Center, his work has focused on fire test methods, smoke movement, and the modeling of fire growth processes in compartments. He has published more than forty papers in his field and is a DOC Bronze Medal recipient.

Fire Measurement and Research Division

The Fire Measurement and Research Division develops and validates measurement methods and data to characterize the fire performance of materials used in engineering applications or in the modeling of fires.

Dr. Richard Gann, Chief, has broad fire research experience in combustion kinetics, fire retardant mechanisms, smoldering combustion, fire suppression, fluid flammability, and fire products generation and analysis. A physical chemist, he spent four years at the Naval Research Laboratory prior to moving to NBS six years ago. At NBS he has continued both fundamental and applied fire research, first as a research chemist and later as a group leader.

The *Materials Fire Properties Group* develop thermal measurement techniques and fire performance test methods, and builds a data base of relevant properties of combustible materials and materials exposed to fires. This includes both test methods directly useful in determining fire hazards and more basic thermophysical or thermochemical properties important in calculating room fire behavior.

The Acting Group Head is Vyto Babrauskas, a fire protection engineer who has worked in room fire calculations, rate of heat release methods, and furniture flammability areas. Before entering the fire field, he had broad experience in electrical and structural engineering. Group Head Jim Winger is on a one-year Commerce Science Fellowship to the US Congress. He is a mechanical engineer with fire experience in consumer products (primarily textiles), furnishings, and mining. Most of this experience involved the development of test methods or standards and problem-solving projects for other agency sponsors. Prior to his work at NBS, he worked in product and process development in the fiber producing and textile industries and in testing in the missile industry.

The *Fire Performance and Validation Group* objectives are to design and conduct tests to evaluate and validate the fire performance of systems, components, and structures. This program includes two important efforts: first, the conduct of unique, highly instrumented experiments to establish fire behavior on a realistic scale; second, the conduct of validation programs in collaboration with other groups. This group provides particular expertise in facility fire test experimental design, instrumentation, and data processing and analysis.

Sanford Davis, Head, has had an extensive background in reinforced plastics and cellular polyurethanes and polystyrene prior to joining NBS. Since 1974, at NBS, he has been involved in the evaluation of the fire performance of interior furnishings in buildings and transportation, and in the development of test protocols for the assessment of the behavior of materials used in furnishings. He also has been responsible for the Center's large-scale fire test facilities. He is active in the NFPA and ASTM voluntary standards activities.

The *Fire Toxicology Group* studies the effect of combustion products on living organisms for use in toxic hazard assessment. This involves determining the composition of potentially harmful combustion products under different fire exposures, establishing the physiological effects of such products, and providing measurement methods for the above.

Barbara Levin, Head of the group, has spent the last four years at NBS working on the development of a small-scale laboratory test method to assess the acute inhalation toxicity of combustion products. Prior to this time, she was a post-doctoral and staff-fellow at the National Institute of Health working in biochemistry and microbiology.

The *Exploratory Fire Research Group* develops scientific knowledge of the processes occurring in fires and new methods to characterize these processes. The research is focused on the chemistry and physics of materials degradation and incomplete combustion.

Kermit Smyth, Head, is a physical chemist. He has extensive experience in laser diagnostics and gas phase chemical reactivity. His current personal research focus is on soot formation chemistry.

Fire Retardant Chemicals Association Holds Fall Conference

The Fall Conference of the Fire Retardant Chemicals Association, held October 13-15 in Toronto, Canada, focused on "Fire Safety Regulations and their Markets—The United States and Canada."

The Program incuded (1) fire retardant regulations in the United States and Canada; (2) specialty markets for flame retardant chemicals in the United States and Canada, and building product markets in the United States and Canada.

Fire Academy Renames Courses

Ten courses at the National Fire Academy for the 1982-83 academic year were re-named to more accurately reflect course content, according to Academy Superintendent Joseph L. Donovan.

Donovan also announced that Fire/Arson Detection will not be offered as a stand-alone course during the 1982-83 academic year.

The ten renamed courses are: "Fire Service Organizational Theory" (formerly "Mid-Management I"), "Interpersonal Dynamics in Fire Service Organizations" (formerly "Mid-Management II"), "Incident Command" (formerly "Incident Command I"), "Advanced Incident Command" (formerly "Incident Command II"), "The Chemistry of Hazardous Materials" (formerly "Hazardous Materials I"), "Hazardous Materials Tactical Considerations" (formerly "Hazardous Materials II"), "Planning for a Hazardous Materials Incident" (formerly "Hazardous Materials III"), "Educational Methodology" (formerly "Educational Methodology I"), "Course Development" (formerly "Educational Methodology II"), and "Managing the Code Process" (formerly "Codes and Ordinances").

In the revised Academy curriculum, "Fire Arson Detection" will be part of special three-week offerings, combined with the "Incident Command" or "Fire Prevention Specialist I" courses.

Donovan indicated these combined offerings are designed to provide a broader spectrum of information to fire company officers and inspectors, the main audiences for the courses.

Each course, "Incident Command/Fire Arson Detection" and "Fire Prevention Specialist I/Fire Arson Detection," will be offered April 11-29 and July 11-29, 1983.

A complete catalog of resident courses to be offered by the National Fire Academy in 1982-83 will be available late in September. For copies, write to Admissions Office, National Fire Academy, National Emergency Training Center, 16825 S. Seton Ave., Emmitsburg, MD 21727.

Fire Marshals Association Re-Elects Greene

The Fire Marshals Association of North America (FMANA) has re-elected Olin L. Greene as president.

Greene was appointed Oregon State Fire Marshal during 1982 and is the former director of the Florida Division of State Fire Marshal. He is the first FMANA president to serve more than one term since World War II.

Also re-elected for the 1982-83 term are Howard H. Summers (chief fire marshal of West Virginia) as vice president; W.W. Golden (chief of the Bureau of Fire Prevention in Columbia, SC) as second vice president; and Captain William R. Rucinski (chief of the fire marshal division of the Michigan Department of State Police) as secretary.

Nearly 1,000 state, provincial, county, and municipal fire marshals in the U.S. and Canada belong to the FMANA. Founded in 1906, the Association is the oldest membership section of the National Fire Protection Association.

Metro Chiefs Elect Executive Committee

The Metropolitan Chiefs Committee of the International Association of Fire Chiefs elected a five-member Executive Committee in April 1982.

Chief Mary W. Klasmeier of the Anne Arundel County Fire Department in Maryland was elected Chairman of the Metro Chiefs Committee. Selected to serve as Vice-Chairman was Chief Herman W. Brice, City of Miami (FL) Fire Department. Committee Secretary is John J. Hart of the New York City Fire Department.

Two members of the Executive Committee Board were also elected. They are Chief Norman Wells, Cincinnati (OH) Fire Department, and then Chief Engineer and General Manager, John C. Gerard of the Los Angeles City Fire Department. Since his election, Gerard has retired from the fire service and is now a consultant to the NFPA Research Foundation.

NFPA Holds Regional Meetings

In a first-of-its kind endeavor, the National Fire Protection Association (NFPA) held a series of nine regional meetings, beginning in April 1982.

Regional Meetings were held in Philadelphia, Honolulu, Atlanta, Dallas, Nashville, Albany, Seattle, Anaheim, and Chicago. Although the specific topics differed for each meeting, technical questions dominated the meetings.

The meetings were designed to provide NFPA members with an opportunity for face-to-face conversations with other NFPA members, board, and staff. State and local fire dignitaries from the host sites were among the active participants in the regional meetings.

NETC Releases New Organization Chart

The *National Emergency Training Center Mission, Organization, and Functions Manual*, approved in August 1982, includes two subdivisions devoted to fire protection.

The organization chart for NETC's National Fire Academy is unchanged in the *Manual*. The three divisions of the National Fire Academy are the Field Programs Division, the Resident Programs Division, and the Materials Development Division.

For the first time, the NETC includes an Office of Fire Prevention and Control. The new Office is on the same organizational level as the National Fire Academy and includes four units. These units are devoted to Federal Fire Policy and Coordination (located at FEMA headquarters in Washington, DC), Fire Data and Analysis, Fire Prevention and Arson Control, and Firefighter Health and Safety.

In addition to the National Fire Academy and the Office of Fire Prevention and Control, the NETC oversees the Emergency Management Institute, the Office of Emergency Management Programs, and the Office of Resource Management and Administration. According to the new *Manual*, NETC is also called the Training, Education, and Fire Programs Directorate.

U.S. Hosts International Fire Protection Conference

The United States hosted the first International Conference of Fire Protection Organization September 15-18. The Conference was held at NFPA headquarters in Quincy, MA.

Delegates and guests from 13 foreign nations, along with the U.S. delegation, reported on fire protection practices and discussed issues of mutual concern during formal and informal meetings. Fire reporting, arson, and human behavior in fires were among the conference agenda items.

Foreign delegates represented Belgium, Canada, Columbia, Denmark, France, India, Japan, Korea, South Africa, Spain, Sweden, Switzerland, and the United Kingdom.

Under a grant from the Federal Emergency Management Agency, the delegates will receive an edited videotape of the conference to assist them in reporting on the conference to their colleagues.

Sixth Annual Conference on Fire Research

The National Bureau of Standards held its Sixth Annual Conference on Fire Research at NBS in Gaithersburg, MD, September 20-22. Agenda topics included fire suppression and extinguishment, smoke and toxic gases, fire toxicology, fire risk analysis, facility firesafety performance, and the fire properties of materials.

Fallen Fire Fighters Honored

As "Taps" was played, fire fighters who lost their lives in service to their communities were honored at the National Observance at the Fallen Firefighters' Memorial, held October 3 at the National Emergency Training Center in Emmitsburg, MD.

This year's ceremony included presentation of the colors by an honor guard of the Baltimore County Fire Department and an address by Louis O. Guiffrida, Director of NETC's parent agency, the Federal Emergency Management Agency.

Dedicated last year, the Fallen Firefighters' Memorial is an 8-foot stone cairn supporting a bronze Maltese cross. An eternal flame is at the base of the Memorial.

An estimated 125 fire fighters die in the line of duty each year and another 100,000 fire fighters sustain line-of-duty injuries.

Kennedy, King Welcome International Electrical Experts

U.S. Senator Edward M. Kennedy (D-Mass.) and Massachusetts Governor Edward J. King headed the list of dignitaries who welcomed the members of the Building Electrical Installation Committee of the International Electrotechnical Commission to their first meeting in the United States. The meeting was held at NFPA headquarters in Quincy, MA October 4-8, 1982.

Stressing the need for fire codes, Senator Kennedy praised the work of NFPA and organizations like the IEC. The Commission is working to develop an international electric code which would include standardized wiring practices.

Committee delegates included approximately 60 representatives from 19 countries.

FERN Newsletter Published

October 1982 marked the publication of the first *Fire Education Resources Network Newsletter*. Published by the Illinois Fire Inspectors Association, the newsletter is funded by the Federal Emergency Management Agency.

The first issue included information on public fire education activities around the country, a calendar of upcoming fire education conferences, and a list of public fire education contacts in each state.

More information on the *FERN Newsletter* is available from the Illinois Fire Inspectors Association, located at 999 N. Elmhurst Rd., Mt. Prospect, IL 60056.

Public Education Newsletter Published

Clark Publishing Company in Mt. Airy, MD, has been publishing a newsletter for those interested in fire problems related to public fire education.

The Premetheus Report is available from Clark Publishing Company, 904 Merridale Blvd., Mt. Airy, MD 21771.

New Association for Public Fire Education Formed

The National Fire and Burn Education Association has been formed, with headquarters in Milwaukie, OR.

The new association has three primary goals, according to its summer 1982 newsletter. These goals are to promote fire education as a profession and a specialized field within the fire service, to provide an expert resource of fire educators who would work to supplement existing efforts and promote resource exchange on a monthly basis, and to promote efforts toward impacting the fire and burn problem in the United States on a measurable basis.

Jim Crawford of Milwaukie, Oregon is the new association's administrative coordinator. The five-member advisory board is composed of Larry Johnson of the Salt Lake City (UT) Fire Department, Joe Day of the Los Angeles County (CA) Fire Department, Kent Marris of the Lees Summit Fire Department in Missouri, Larry Marshburn of the Huntington Beach (CA) Fire Department, Pat Mieszala of the Chicago-based Burns Concerns organization, and Diane Roche of the Virginia Beach (VA) Fire Department.

Offices for the NFBEA are located at 5202 SE Monroe St., Milwaukie, OR 97222.

10 Named to LNTB Network

The National Fire Protection Association (NFPA) has named 10 regional representatives for the Learn Not to Burn Curriculum. The regional representatives are available to provide technical assistance in the implementation of the LNTB curriculum in elementary schools. Each representative serves specific states.

The LNTB regional representatives are:

Jan Gratton of Covina, CA for California, Hawaii, and Nevada;

Ron Mehlert of Edmonds, WA for Alaska, Idaho, Montana, Oregon, and Washington;

Hugh Graham of Stillwater, OK for Colorado, Kansas, Nebraska, Oklahoma, Wyoming and Utah;

Carol Gross of Phoenix, AZ for Arizona, New Mexico, and Texas;

Cathy Lohr of Raleigh, NC for Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, and Tennessee;

Antona Richardson of St. Paul, MN for Iowa, Michigan, Minnesota, North Dakota, South Dakota, and Wisconsin;

Pat Mieszala of Chicago, IL for Illinois, Indiana, Kentucky, Missouri, and Ohio;

Edi Maletsky of Aston, PA for Delaware, Maryland, Pennsylvania, Virginia, West Virginia, and Washington, DC;

Bill Porter of Bethany, CT for Connecticut, New Jersey, and New York; and

Bruce Pollock of Keene, NH for Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont.

In addition to the 10 regional representatives, NFPA named Teresa Smalley of Scituate, MA as representative-at-large.

1982 Year in Review — National

By George C. Horvath

The Reagan Administration's commitment to cut back on federal spending threatened governmental fire protection programs in 1982. The Administration cited a number of principles to justify the cutbacks: that government shall not duplicate the activities of the non-governmental sector; that state powers preempted by the federal government over a number of decades shall be returned to the states; that voluntary interaction among people, for the public good, shall be encouraged; and, finally, that the role of government is to serve the people and not the reverse. By year's end, application of these principles left a mixed bag of blessings, setbacks, and unanswered questions within the fire protection community, including the most important: to what extent and in what manner will federal fire programs be implemented beginning in fiscal 1983?

USFA Rescued

As a conclusion to a year-long struggle to support continuation of the U.S. Fire Administration (USFA), on September 30, President Reagan signed into law a $4.15 million FY'83 appropriation for specific fire programs (P.L. 97-272), as well as a non-germane amendment to the National Aeronautics and Space Administration authorization that more or less mandates continuation of the USFA (P.L. 97-324). The appropriation measure allocated $750,000 for the arson prevention and control program; $1 million for the National Fire Data System; $400,000 for fire-rescue service management improvement; and $850,000 for 20 full-time positions at the USFA. Following enactment, the Federal Emergency Management Agency (FEMA), (the USFA's parent organization) confirmed that funds for fire programs will be spent as appropriated and that FEMA will abide by the mandate of the Federal Fire Prevention and Control Act of 1974, as amended, to continue the USFA as a separately identifiable organizational unit within FEMA.

In previous years, the U.S. Fire Administration had operated on an $18.5 million annual budget, including funds for the Fire Academy and for the NBS Center for Fire Research. Beginning October 1981, the Fire Academy was reorganized and made part of the National Emergency Training Center (NETC). Fire Academy programs in FY'83 continued to receive $8 million in appropriations through FEMA. The close to $5 million funding for the NBS Center for Fire Research was incorporated into the Department of Commerce (DOC) NBS budget and appeared to be noncontroversial as of late 1982. Accordingly, compared to the USFA's past $18.5 million appropriation, the combined FY'83 appropriations for the Academy, the NBS Center for Fire Research ($4.991 million), and the enumerated fire programs ($4.15 million), the reduction amounts to only $1.359 million, or 7.34 percent of the previous years' appropriations. But just how FEMA will implement the $4.15 million worth of programs is yet another question. As mandated by law, FEMA will assign or rehire a 20-member staff for USFA purposes, but grants and contracts to the private sector and to nonprofit organizations are likely to play a major role.

Consolidation of emergency management activities into one Federal Emergency Management Agency (FEMA) was accomplished to provide a single point of accountability for all federal emergency preparedness, mitigation, and response activities, and to enhance the multiple use of emergency preparedness and response resources at the federal, state, and local levels. Since the fire services invariably are in the forefront of any emergency mitigation activity, FEMA provides a point of interaction for the fire services in a variety of these activities. Even though FEMA was created in 1978 during the Carter Administration, it was President Reagan who sought to give added significance to the agency through increased funding. But Congress in 1982 did not go along with the President: the original FY'83 FEMA budget request of $850 million was slashed to become a $550 million appropriation.

BATF Continues

Much like the USFA, the Treasury Department's Bureau of Alcohol, Tobacco and Firearms (BATF) was also slated for abolition by the Administration's FY'83 budget in early 1982. As in the case of the USFA, Congress, supported by the Joint Council of National Fire Service Organizations (JCNFSO), expressed its support of the BATF and, in particular, its arson abatement program. The BATF has been assisting state and local authorities in arson investigations by providing laboratory facilities and investigation support for these activities. It has been said that BATF's role could be credited with high conviction rates of arsonists in certain areas. The FY'83 appropriations for the Treasury Department strengthened and increased funding for the BATF, even though overall Treasury appropriations were reduced. One hundred forty-five million dollars were appropriated for purposes of the BATF, and arson abatement was to remain within the agency. In the end, Treasury/BATF appropriations became part of the overall continuing appropriations measure (P.L. 97-377).

Center for Fire Research Reorganized

Having obtained funding independent from the USFA, the NBS Center for Fire Research (CFR) was reorganized. Under the overall leadership of Dr. Jack Snell, the CFR's Office of Fire Research Resources administers research grant programs, supplies library and computer support, and manages the Center's anti-arson activities. The Fire Safety Technology Division plans, coordinates, and conducts research and engineering studies to develop quantitative measures of fire risk and engineering tools to predict the performance of facilities and people in fire. The Fire Measurement and Research Division develops and validates measurement methods and data to characterize the fire performance of materials in engineering applications or to use in the modeling of fires.

Federal Agencies and Firesafety Standards

The USFA, the BATF, and the NBS, however, never had any regulatory authority in the field of firesafety. Their functions were limited to research, training, and technical and financial assistance, and to law enforcement with regard to explosions, while regulation and enforcement of firesafety laws and ordinances were left for the states and, to the extent that state authority had been preempted, to certain other federal agencies. The following discussion pertains to the fire protection aspects of these other federal agencies.

NFPA's chief role with regard to the firesafety aspects of federal regulatory law and of government facilities safety management is that of the provider of consensus standards. For this reason, the federal government's standards policy and, in particular, its position concerning federal participation in and use of voluntary standards, like those of NFPA, are of crucial importance.

As contrasted to previous years' practice when the Federal Trade Commission (FTC), the Office of Management and Budget (OMB), and the Office of Product Standards Policy (OPSP) of the U.S. Department of Commerce (DOC) competed with each other as to how to regulate the voluntary standards community, 1982 brought welcome relief. OMB Circular A-119 was reissued on October 26 as an unequivocal encouragement to federal officials to participate in voluntary standardization processes and to rely — in both procurement and regulatory activities — on voluntary standards.

The DOC's OPSP was frozen upon the inauguration of President Reagan in 1981 and was later transferred to the NBS. Its new head, Dr. Stanley Warshaw, looks favorably upon standards-writing groups like NFPA and considers encouragement of full implementation of the revised Circular A-119 as one of his important functions. Warshaw's other functions of interest to the fire protection community include laboratory accreditation.

The Interagency Committee on Standards Policy (ICSP), the forum before which matters such as the objectives of Circular A-119 must be promoted, also received a boost through reorganization. Beginning in September, its membership was changed to consist of Senior Executive Staff officials — decision-makers who formulate policy rather than mid-level officials who carry out policy. Indeed, misconceptions about the misuse of standards may be viewed as the root-cause of much of the regulatory malaise of the 1970s and, thus, full understanding by policy-makers of the concepts and problems may be one of the most important steps to true regulatory reform.

Notwithstanding these favorable developments, however, the FTC staff continued to maintain the need for an eventual FTC Standards and Certification Rule. But with cutbacks at the FTC and the vigorous leadership of FTC Chairman James C. Miller III, deadlines for the promulgation of the proposed rule were repeatedly postponed. The latest promised deadline of December 1982 for the staff report was missed altogether.

Among the questionable or perhaps unfavorable developments regarding the future viability and governmental use of voluntary standards, are two U.S. Supreme Court decisions. One decision centered on the antitrust liability of standards developers by virtue of the unauthorized activities of its volunteer agents, in this case, technical committee members (*ASME* v *Hydrolevel*), and another concerned municipal antitrust liability (*Community Communications* v *Boulder*). The latter is likely to adversely affect the states' traditional police (regulatory) powers. The Senate Judiciary Committee held two hearings on the impact of the Supreme Court's decision. However, no legislation resulted.

Regulatory Reform

From the viewpoint of the federal government's standards policy, certain legislative trends also provided cause for mild, if only temporary concern. The Senate Judiciary Committee initially perceived regulatory reform purely as a matter of cost-benefit analysis, potentially negating the intrinsic merits of consensual decision-making in matters related to public safety. By the time the related bill passed the Senate, explanatory language with a common sense view of issues had been added, leaving room for reliance on consensual processes. The House had a different approach to regulatory reform. The bill (H.R.746) had been bottled up in the Judiciary Committee almost to the end, and manuevers by the House Rules Committee ultimately rendered the House bill dead in December. Congressional sources doubt that regulatory reform can be revived in the 98th Congress.

Regulatory Negotiation

Regulatory negotiation emerged as an alternative method of federal rulemaking that would allow federal agencies to follow consensual decision-making processes for federal rulemaking. The Administrative Conference of the United States (ACUS) adopted an affirmative recommendation on the subject. Legislation was sought to reinforce the ACUS recommendations. By the end of 1982, however, there appeared to be no chance that any of several versions of the bill would pass. It is unlikely that implementation of the ACUS recommendation by federal agencies would constitute a threat to NFPA standards (through either duplication or preemption) while President Reagan is in office. It must be kept in mind, however, that such a recommendation exists and that supportive legislation is not a must for agencies to implement the recommendation. A study being prepared by the Congressional Office of Technology Assessment is expected to clarify the needed differentiation between "required negotiation" and consensus standardization processes.

Risk Analysis Research and Demonstration

On the other hand, Risk Analysis Research and Demonstration bills were introduced in both Chambers, and the House passed the bill during the regular session. The Senate Commerce Committee reported favorably on the bill, but floor action had not been scheduled in the waning days of the lame duck session. The bill died in the Senate in late December, amidst filibusters on more important issues. Although little understood by legislators because of its technical and scientific basis, enactment of this concept into law may hold the greatest promise toward true regulatory reform. Briefly, the bill establishes a program under the coordination of the Office of Science and Technology Policy for

THE UNITED STATES FIRE ADMINISTRATION

As created under authority of the Federal Fire Prevention and Control Act of 1974 (15 *U.S.C.* 2201), the USFA's goal had been to reduce the national fire loss. Originally, the USFA was placed within the U.S. Department of Commerce (designated as the National Fire Prevention and Control Administration), but was transferred into the newly created Federal Emergency Management Agency (FEMA) in 1978. Its functions were to conduct and to support training, planning, and education efforts for fire service and other federal, state, and local personnel, as well as the public at large, and to support research activities to decrease fire-caused deaths, injuries, and economic losses, and to increase the effectiveness of fire protection. The USFA maintained a National Fire Academy in Emmitsburg, Maryland, and by virtue of pass-through funding, supported the Center for Fire Research (CFR) at the National Bureau of Standards (NBS).

Initial indication of the USFA's demise came when, in early 1982, the President's fiscal 1983 Federal Budget requested zero funding for the USFA. "The goal of this program has been to reduce by 50% the nation's loss of life from unwanted fire and to achieve significant reductions in property and nonfatal human injury due to fire by the year 2000," the Budget read. "This program has improved the cost-effectiveness of the various fire protection services. Due to the significant decrease in loss of life and property due to fire and the increased efforts of the private sector, this program will be discontinued in 1982 . . . ." But the Fire Academy was to be saved as part of an emergency management training facility, and so was the NBS' Center for Fire Research; the latter to receive direct funding at previous years' level.

Responding to the President's proposal to eliminate the U.S. Fire Administration, Congress, supported by the Joint Council of National Fire Service Organizations (JCNFSO), including NFPA, repeatedly went on record in support of continuing the USFA as a separate, identifiable federal agency and the continuation of its funding at previous levels. The House passed Concurrent Resolution 288 in support of the USFA, and the Republican-controlled Senate Commerce Committee unanimously approved a non-germane amendment to the National Aeronautics and Space Administration authorization bill, offered by Senator Howard W. Cannon (D-NV), that mandated continuation of the USFA at a $20 million funding level. In the context of the USFA's own, and the NBS authorizations, the die appeared to be cast: officials in March assured the House Science and Technology Subcommittee that little or nothing would be lost with the elimination of the USFA and that the NBS and the Fire Academy would carry on the USFA's most important functions.

By late September, most of the USFA staff had been transferred to other offices within the Federal Emergency Management Agency and USFA Administrator Dr. B.J. Thompson had resigned effective October 1, the beginning of the new federal fiscal year. It was then that FY'83 appropriations for fire programs were made.

improving the use of risk analysis by those federal agencies concerned with regulatory decisions related to the protection of human life, health, and the environment. The bill recognizes the mixed factual and judgmental nature of risk evaluation, and mandates research and demonstration projects to establish means for risk analysis.

Firesafety and Related Legislation

Most federal rules that in one way or another involve firesafety have been in place for several years (see chart in the Standards section of this *Almanac*). In many instances, undoing at the federal level, what may be considered by the Reagan Administration as excessive exercise of federal authority, would take an act of Congress, by either repealing or modifying statutes that are on the books.

Whatever fire legislation was dealt with by the Second Session of the 97th Congress came in uncoordinated bits and pieces or as provisions of, or amendments to, major legislation of an unrelated nature.

Arson Control. Section 844 of the *Criminal Code* (18 *U.S.C.* 844) was amended a) to clarify applicability of offenses involving explosives and fires, and b) to direct the FBI to classify the offense of arson as a Part I crime in its Uniform Crime Reports (P.L. 97-298, October 12, 1982). Another measure providing more clarification to the arson aspects of the *Criminal Code* saw final action during the lame duck session (S.2572 and H.R.3963) and was expected to be signed into law. None of this legislation, however, expands federal authority or diminishes state authority over arson offenses. Arson, *per se*, was not made a "federal offense," except when it takes place in interstate or foreign commerce, on federal or federally assisted property, or in the commission of a felony "which may be prosecuted in Federal Court."

Fire Fighting Contract. The Defense Department's FY'83-84 authorization measure (P.L. 97-252, September 9, 1982) includes a provision that prohibits the obligation or expenditure of funds for entering into contract for the performance of fire fighting functions at military installations, except for the renewal of contracts in effect on the date of enactment of the authorization measure. The prohibition is limited to FY'83.

Surplus Federal Property to Volunteer Fire Departments. A bill introduced in the Senate (S.2625) passed that body on August 12, 1982 but as of early December, the House did not act on the measure. A more comprehensive measure (S.1444), transferring ownership of surplus military property on loan to state and local governments cleared both chambers. According to the Act, FEMA was to certify that the property donated was for civil defense use.

Public Safety Officers Benefits: A bill to provide $50,000 death benefits to federal public safety officers (H.R.756) passed the House, August 4, but was not acted upon by the Senate. The measure is identical to one vetoed by President Carter in 1980 on grounds that it created unwarranted and preferential benefits for a group of federal workers. President Reagan was also opposed to the measure. An amendment to the continuing appropriations bill in the Senate providing for the purposes of H.R.756, passed that body by voice vote, but was subsequently deleted by House - Senate conferees. The existing Public Safety Officers' Benefits (PSOB) program providing death benefits at the state and local level continued at year's end, pending enactment of appropriations for the Department of Justice. Bills to expand the program to cover ambulance drivers and non-occupational cause of death were subjects of hearings, but no action took place during the 97th Congress.

Other topics that attracted Congress' attention but generated no substantive action were grain dust explosions and toxicity of combustion products. The *grain dust issue* emerged as the result of a National Science Foundation (NSF) study on the subject. *Toxicity* was the subject of an extensive National Bureau of Standards (NBS) study released in July and entitled *Further Development of a Test Method for the Assessment of the Acute Inhalation Toxicity of Combustion Products* (NBSIR 82-2532) and conference entitled *Combustion Product Toxicity* held September 10 at NBS headquarters in Gaithersburg, Maryland.

* * *

In Charleston, South Carolina, one fire was started in 1800 when a citizen investigated a leak in a barrel of brandy. He was using a candle to see what the trouble was. The brandy ignited, and the keg of gunpowder nearby added to the merriment of the occasion. In modern times, the man who looks for a gas leak with a lighted match is no improvement.

(From the History of the Charleston, South Carolina Fire Department)

1982 Year in Review/Industry

General Motors Corporation

Detroit, Michigan
Manufacturer of vehicles

"1982 has been a period of general transition from a period of uncertainty to one of progressive stabilization." This was how Gerald Rosicky, Director of Security, Industrial Relations Staff of General Motors Corporation in Detroit, characterizied his operation in an interview with a *Fire Almanac* editor. Fire protection at GM has become a more streamlined operation over the past few years. Leaner operations, however, do not necessarily mean less fire protection. What it does mean, according to Rosicky, is better efficiency - finding new solutions to perform the same job at a lower cost and with a better use of available personnel, thus achieving a better cost/benefit ratio overall.

Like business and industry everywhere, GM has had to "rethink old ways," as Rosicky said, to economize during the economic recession. In smaller GM facilities, this has meant taking a closer look at what Rosicky called "the adequacy factor." He said that while a redundancy factor is built into larger plants when fire protection is planned, this is not being done in the smaller facilities. There, getting the most for dollars spent and achieving cost savings are significant issues.

Assets, however, need to be protected, and Rosicky justifies fire protection on that basis. He listed two areas of costs for fire protection: new construction, where typically 10 percent of the building construction costs are devoted to fire protection such as in-house water supplies, fixed fire protection, alarm, and sprinkler systems; and on-going expenditures at all sites. Plant modernization is an on-going program, in addition to the construction of three new assembly plants that are being built in the United States. Plants of 3 million square feet each are being constructed in Orion Township, Michigan, Wentzville, Missouri, and in Detroit. These plants will provide an opportunity for Rosicky to pilot new fire protection systems. (In an interesting sidenote, Rosicky mentioned that when a new 5 million sq. ft. plant was recently built in Spain, the same level of fire protection maintained in other European plants in the past was achieved by headquarters working more closely with the overseas personnel, particularly the Germans, than they have in the past.)

Rosicky commented that the economy has encouraged GM to provide more training for plant level security personnel to ensure a certain skill level is maintained. Since the luxury of having enough people to perform all the fire protection functions required is not possible, this means that those who are responsible for plant fire protection need to know as much as they possibly can. Rosicky described GM's fire protection school which is run four times a year with two sessions each in the spring and the fall on basic fire protection. (A course on advanced fire protection is given twice annually, once in the spring and again in the fall.) At these sessions, ideas are exchanged by corporate headquarters and plant level security personnel and by all students with each other.

When Rosicky was asked how the 1980 OSHA Act regulations impacted his operations at GM, he said that "nuisance-type citations have dropped dramatically." Explaining further, he said that before the regulations were rewritten, it was common for citations to be given when extinguisher height was different from what the regulation specified. Now with the new performance-oriented regulations, Rosicky can develop an overall program to meet the criteria. He would like to see all OSHA standards written on a performance-oriented basis, which he thinks would benefit the entire business and industrial community.

We asked Rosicky to comment on how technical developments in fire protection have impacted GM's fire protection operations. In response, he said the use of microprocessors for proprietary alarm systems will make the receipt and transmission of alarms easier to program and reprogram, and thus will be more cost-effective. Such systems, which consolidate old solid state equipment to microprocessors that are user-friendly, can be reprogrammed by personnel at the local facility rather than centrally. He also commented on the introduction of the large-droplet sprinkler that has the ability to provide fire protection to high challenge fire hazards such as plastic materials. This is especially important to GM, because the car manufacturer is substituting more plastic for metal in its vehicles. The heightened combustibility hazard presented by plastics will need to be protected in both process and storage areas. Large droplet systems have already been installed by GM and may replace old systems now in place.

When asked about technical areas that should be explored in the future, Rosicky said that organizations need to refine modeling techniques of fire testing so that they can predict fire scenarios more accurately. This ability should help personnel responsible for plant safety and security to maintain an adequate level of fire protection. Another area for exploration, he believes, is the use of computer-base systems to perform management functions.

In commenting on the outlook for 1983, Rosicky's concern was whether the economy will get worse. A worsening of the economy may, he said, lead to some decisions that will hurt fire protection. But on a more optimistic note, he points out that GM has held on until now, maintaining the level of protection needed, though on a new base. Even at a giant like GM, less is more.

Xerox Corporation

Stamford, Connecticut
Manufacturer of electronic office equipment, including business machines and small computers

According to Carroll V. Lovett, P.E. (Fire Protection), Corporate Manager Fire Protection and Loss Control, Xerox Corporation experienced very little effect from the economy in 1982 on its fire protection operations until the latter part of the third quarter. However, even then, the impact was minimal and connected with a slowdown in new construction. One major retrofitting operation was temporarily held up, but it was released in the fourth quarter.

Previous to the third quarter, the first and second quarters had had no serious impact on fire protection operations at Xerox, which spends approximately 1.3 million annually on upgrading, retrofitting, renovating, and constructing fire protection systems and operations. Xerox is able to keep the effects of a generally poor economy on both long and short term planning to a minimum, said Lovett, by ensuring that the most cost-prudent methods are used and by eliminating the methods that are not cost-justifiable. Economizing is teamed with careful ranking of priorities to achieve the same results enjoyed in more affluent years.

As Lovett explained, Xerox believes it makes good business sense to set high firesafety standards, and by following the national consensus standards, including NFPA and ANSI standards. Since Xerox insists on maintaining high safety standards, the 1980 OSHA Act regulations have had very little impact on operations throughout the Corporation's facilities. When asked what further changes should be incorporated in federal regulations governing fire protection, Lovett first praised the performance-oriented course the regulations have recently taken and then stressed the need for updating and modifying the regulations to reference current standards. He explained further that the current regulations reference the 1978 edition of the *National Fire Code*, and that many standards have been updated since that time.

When asked how new technical developments have or will have impact on fire protection operations at Xerox, Lovett replied that technological improvements in sprinker installation and equipment have had the effect of keeping costs for sprinkler systems from escalating. For the future, he believes that electronic surveillance alarm systems will be so sophisticated that they will provide better reliability and require less maintenance than is available now. Since he believes maintenance has generally fallen off in the last few years, these new systems should improve on the human error factor. If Lovett could determine the technical area to be explored in coming years, he would choose to develop plastic piping for light hazard occupancies that is less costly and simpler to install. The reason for this choice is that the use of plastic piping will keep installation costs to a minimum and make it easier to convince management to establish good overall fire protection due to the lower cost.

Taking stock of 1982, Lovett sees Xerox as having made strides in evaluating, cost-justifying, and ranking priorities in fire protection. During 1982, major locations were evaluated to ensure that the kinds of large dollar losses sustained in other industries don't happen at Xerox. He wants to see that Xerox's good fire record is maintained.

Looking forward to 1983 and beyond, Lovett sees that his worst problems will be keeping pace with material handling techniques (i.e., warehousing, production lines, storage arrangements) and the use of plastics in packaging materials. Both areas of concern present challenges in providing adequate fire protection.

Best Media Coverage of Fire Fighting, 1982

Every year, the International Association of Fire Fighters honors news media for reporting and photography that best portray the professional and hazardous work of the U.S. and Canadian fire fighter. There are six general media categories, each with a first prize of $500 and second prize of $250. Material published between Jan. 1 and Dec. 31, 1983, is eligible. Nominations must be submitted by local unions by March 15, 1984. Further information is available from the local fire fighters union or by writing to: Awards Contest, International Association of Fire Fighters, 1750 New York Ave., NW, Washington, DC 20006.

1982 IAFF Media Awards Winners

Best News or Feature Story in a Newspaper of Less than 100,000 Circulation

First Prize: "Lives on the Line — Agony in Return," by Jim Macak in the Warren, OH, *Sunday Tribune.*

Second Prize: "First Firefighters Saw Ball of Flame Engulf Casino," by Chris Broderick, in the Las Vegas, NV, *Review-Journal.*

Honorable Mention: "Firefighting Below Zero," by Margaret Nelson in *Alaska Fest Magazine.*

"A Tale of Two Fires," by Peter Hechtor, in the Portage, MI, *Headliner News.*

"A Star Banner Reporter, a Nurse, and the Mayor Discover What 'Hot' Really Means," by Leonard Kransdorf in the Ocala, FL, *Star-Banner.*

Special Award of Merit: Bob Sweeney and Jody Storgoff of the *Colorado Statesman,* of Denver, for two-part coverage of a special municipal election on the Denver fire fighters' collective bargaining agreement.

Best News or Feature Story in a Newspaper of More than 100,000 Circulation

First Prize: "In Case of Fire/Crisis in the SFFD," by Tim Reiterman in the San Francisco, CA, *Examiner.*

Second Prize: "Firemen's Safety: A Health Issue," by Allan Parachini in the *Los Angeles Times.*

Honorable Mention: "Fireman's Comrades Mourn Death But They Love Jobs Despite Danger," by Eric Malnic in the *Los Angeles Times.*

"Airport is 'Unprepared for Disaster'," by Ron Sympson and Brian Jones in the Fort Lauderdale, FL, *News.*

Best News or Feature Photo in a Newspaper of Less than 100,000 Circulation

First Prize: "One-armed Grab Saves Man," by Lee Bernard, in the Huntington, WV, *Herald-Dispatch.*

Second Prize: Untitled, by Barry J. Grossman in the Absecon, NJ, *Sun.*

Honorable Mention: "Fight to Save Tot," by Jack Burnett in the Huntington, WV, *Herald-Dispatch.*

Best News or Feature Photo in a Newspaper of More than 100,000 Circulation

First Prize: "No Water," by Bruce Chambers, in the Rochester, NY, *Times-Union.*

Second Prize: Untitled pair of photos by Mike Greenlar in the Syracuse, NY, *Herald-Journal.*

Honorable Mention: Untitled series by Mike Meadows in the *Los Angeles Times.*

"Shrouded by Smoke," by David Leeson in the Abilene, TX, *Reporter-News.*

Best Local Union Publication

First Prize: *Boston Firefighters' Digest,* Boston, MA.

Second Prize: "Jump Line," Dade County, FL.

Honorable Mention: "The Master Stream," Erie, PA.

"The LA Firefighter," Los Angeles, CA.

Letter of Commendation: "Protect Someone You Love," a slide film presentation used as a fire/burn prevention program for elementary school students and prepared by Eire, PA IAFF Local 293 and the Regional Burn Unit at Eire's Hamot Medical Center.

Best Television News or Feature Coverage

First Prize: Eric Braun and Jenny Crimm, WEWS, Cleveland, OH for "The Effect of Undermanning."

Second Prize: Kevin Evans and Frank Mahon, CITY-TV, Toronto, Ontario, Canada for series on the effects of arson.

Honorable Mention: Bill Britt and Bob Tews, KBTV, Denver, CO. "Three Alarm Fire," focuses on the hazards faced by fire fighters as a matter of daily routine.
David Margulies and Del Skews, WFAA-TV, Dallas, TX. "Docs/Paramedics."

Best Radio Commentary

First Prize: Charles Gray, WDAF, Kansas City, MO. Commentary on fire fighter heroics.

Second Prize: Jim Miller, WEST/WLEV, Spectrum-Lehigh Valley, Easton, PA. Commentary on dangers to fire fighters involved in rescue attempts of victims of twister that damaged homes.

Honorable Mention: Mark Demarino, "Up in Smoke," WGAR, Cleveland, OH. A series of short features on arson.

KNX, Los Angeles, CA. A series of editorials broadcast at four separate time slots on firesafety issues.

Bill Viands, General Manager, WIOD/WAIA, Miami, FL. "Robert Casey Lamme," a brief commentary on a fire fighter's death as a result of an off-duty attempt to rescue a woman.

Organizations and People

Joint Council of National Fire Service Organizations

The Joint Council of National Fire Service Organizations was organized in Williamsburg, Virginia on September 1, 1970, with the intent and purpose of providing a wav for national fire service orgnizations to cooperate informally in the definition and achievement of those national goals of the fire service in which they share a community of interest.

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Fire Marshals Association of North America

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202-484-8200

The Fire Marshals Association of North America which was organized in 1906 and reorganized in 1927 as a section of the National Fire Protection Association, is a body of fire marshals, heads of fire prevention bureaus, fire investigators and their staffs. Membership is open to those officials holding the positions named above who work for a state, a province, a county, a town, a city, a municipality or a fire protection district, and to whom the responsibility for fire prevention or investigation has been assigned by law or delegated by the chief of the fire department.

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International Association of Arson Investigators

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The International Association of Arson Investigators was formed at Purdue University, West Lafayette, Indiana in 1949, when insurance industry, fire service, and law enforcement personnel from the United States and Canada met to discuss the growing arson problem and the need for training and education in fire investigation. The Association has the following objectives:

- To unite for mutual benefit those public officials and private persons engaged in the control of arson and kindred crime;
- To provide for exchange of technical information and developments;
- To cooperate with other law enforcement agencies and associations to further fire prevention and the suppression of crime;
- To encourage high professional standards of conduct among arson investigators;
- To continually strive to eliminate all factors which interfere with administration of crime suppression.

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Andre C. Schalk
Dept. of Public Safety
5333 Fairbanks St., Suite 11
Anchorage, AK 99502

David M. Smith
10 E. Broadway, Suite 207
Tucson, AZ 85701

International Association of Fire Chiefs

1329 18th Street, NW
Washington, DC 20036
202-833-3420

The International Association of Fire Chiefs was organized in 1873 to further the professional advancement of the fire service and to insure and maintain greater protection of life and property from fire. Its purposes are fulfilled by: (1) conducting research and studies of major problems affecting the fire service at community, state, provincial, regional, national, and international levels; (2) developing and implementing an active program vital to the continued well-being of the fire service; (3) serving as the recognized organization for the exchange of ideas, information, knowledge, and experience in areas affecting the safety of life and property from fire;

(4) encouraging and developing public education in fire prevention to preserve human life and material resources; and (5) promoting educational programs in the best interests of the fire service.

Executive Committee
Chief Charles Kamprad, President
St. Louis, MO

Chief Douglas Pollington, First Vice Pres.
Cambridge, Ont., Canada

Chief Gerald A. Carle, Second Vice Pres.
Dracut, MA

Chief William T. Stewart, Treasurer
Fargo, ND

Chief E. Stanley Hawkins, Immediate Past President
Tulsa, OK

John H. Otte, Director at Large
Normandy, MO

Division Directors
Canadian Division:
Chief Arnold Quillman

Eastern Division:
Chief A. L. Hopson

Great Lakes Division:
Chief George Danz

Missouri Valley Division:
Chief John H. Otte (Acting)

New England Division:
Chief Gerald A. Carle

Southeastern Division:
Chief Fire Marshal Dan J. Carpenter

Southwestern Division:
Chief James E. Lewis

Western Division:
Director Robert H. Ely

International Association of Fire Fighters
1750 New York Avenue
Washington, DC 20006
202-872-8484

Organized in 1918, the IAFF has approximately 175,000 members in the United States and Canada. The IAFF is affiliated with the American Federation of Labor and the Congress of Industrial Organizations in the United States and the Canadian Labour Congress. Any person who is engaged as a permanent and paid employee of a fire department is eligible for active membership through the chartered locals, state or provincial associations, and joint councils. The IAFF Headquarters provides a variety of services to the membership, among which are: technical assistance in the occupational safety and health area; labor relations expertise through in-house personnel and field representatives; an extensive educational seminar program; legislative representation at the national level; and public relations guidance.

International Officers
John A. Gannon, President
1750 New York Ave.
Washington, DC 20006

Alfred K. Whitehead, Secretary-Treasurer
1750 New York Ave.
Washington, DC 20006

Vice Presidents:
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Donald Faughnon
126 Cross St.
Binghampton, NY 13903

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Joseph McMahon
6302 Berthold Ave.
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3rd District
Dustin Alward
69 Silver St.
Randolph, MA 02368

4th District
Raymond M. Hemmert
S.E. Corner 5th & Willow Sts.
Philadelphia, PA 19123

5th District
Leroy Waite
524 Pleasant St.
Beloit, WI 53511

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Tacoma, WA 98467

8th District
Earle Deguise
821 S. Harrison St.
Saginaw, MI 48602

9th District
Ron Usher
7931 Southeast 107th St.
Portland, OR 97266

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P.O. Box 1298
Perris, CA 92370

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1430 N. St. Mary
San Antonio, TX 78215

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4146 N.W. 19th Terr.
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16th District
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22 N. Main St.
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137 Ragan Way
Grass Valley, CA 95945

William A. Laird
62 Westmount Bay
Winnipeg, Manitoba, Canada R2J 1Y9

John J. Jennings
130 Bowdoin St., Suite 710
Boston, MA 02108

International Fire Service Training Association

Fire Protection Publications
Oklahoma State University
Stillwater, OK 74078
405-624-5723

The International Fire Service Training Association was founded in 1934, and is organized to develop training materials for the fire service. Committees meet each July in Stillwater to review existing or proposed manuals. All validated manuals are published by the Fire Protection Publications division of Oklahoma State University. IFSTA's objectives are: (1) to develop training materials and visual aids for publication; (2) to add new techniques and developments; (3) to delete obsolete and outmoded methods; (4) to validate training materials for publication; (5) to provide materials for students and instructors to assist in certification; and (6) to upgrade the fire service through training.

Executive Board

Harold R. Mace, Executive Director
Manager, Fire Service Training and
Fire Protection Publications
Oklahoma State University

Howard Boyd, IFSTA Chairman
Consultant
Nashville, TN

Marvin L. Austin, IFSTA Executive Sec.
Insurance Service Office
Chicago, IL

Bob Baca
Fire Marshal's Office
Santa Fe, NM

Edward W. Bent, Supervisor
Fire Service Training Program
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Paul H. Boecker, Fire Chief
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Lisle, IL

John Hoglund, Director
Maryland Fire and Rescue Institute

Frank Hubble
Department of Fire Programs
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Catherine B. Lohr
Fire Education Specialist
N.C. Department of Insurance

Thomas Makey
Deputy Fire Commissioner
Edmonton, Alberta, Canada

Charles L. Page
Fire Protection Training Division
Texas A&M University

Max McRae
District Chief
Houston Fire Department

Kenneth Stanton
National Automatic Sprinkler Inc.
Indianapolis, IN

Max M. Thomas, Director
Fire Service Training
University of Kansas

International Municipal Signal Association

Box 8249
Fort Worth, TX 76112
401-274-1150

The International Municipal Signal Association was organized in 1896. It is an educational, nonprofit organization dedicated to conveying knowledge, technical information, and guidance to its membership, which consists of municipal signal and communication department heads and their first assistants. The range of communications cover traffic control, fire alarm, and police alarm.

Executive Board
Harold Glerum, President
150 E. Miller St.
Newark, NY 14513

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P.O. Box 401889
Garland, TX 75040

Thomas Norton, Second Vice President
88 Ministerial Dr.
Concord, MA 01742

John Corbett, Third Vice President
Canton, OH

Robert Llewellyn, Executive Director
Box 8249
Fort Worth, TX 76112

International Society of Fire Service Instructors

20 Main St.
Ashland, MA 07121
404-424-7315

The International Society of Fire Service Instructors was organized in 1960. The Society is comprised of those persons who are responsible for the training of fire officers, fire fighters, and rescue and emergency medical personnel. The mission of the Society is to provide effective and continuous leadership in education and training of the fire service for the protection of life and property against fire, and related manmade or natural disasters.

ISFSI Executive Staff
Harold Thompson, President
Superintendent, Georgia Fire Academy
1112 Clay St.
Marietta, GA 30060

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20 Main St.
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7201 Carroll Ave.
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8101 38th Ave., North
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State Fire Instructor
P.O. Box 5
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3703 W. Girard Ave.
Denver, CO 80236

Metropolitan Committee of the International Association of Fire Chiefs

1329 18th Street, NW
Washington, DC 20036
202-833-3420

The Metropolitan Committee of the International Association of Fire Chiefs was organized in 1965. The membership of the Metropolitan Committee is limited to active fire chiefs of cities or jurisdictions having a population of more than 200,000, or a minimum of 400 career members, and who are current members of the International Association of Fire Chiefs. The mission of the Metropolitan Committee is to assist the International Association of Fire Chiefs in developing and propagating policy concerning major fire departments.

Metropolitan Committee Executive Staff

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Chief, Anne Arundel County Fire Dept.
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Chief, Cincinnati Fire Department
430 Central Ave.
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John C. Gerard, Past Chairman
Chief Engineer & General Manager, Ret.
Los Angeles City Fire Department
200 N. Main St.
Los Angeles, CA 90012

National Fire Protection Association

Batterymarch Park
Quincy, MA 02269
617-328-9290

The National Fire Protection Association is an independent, voluntary membership, nonprofit organization. Organized in 1896, the Association has as its mission the safeguarding of man and his environment from destructive fire, using scientific and engineering techniques and education. Activities of NFPA generally fall into two broad, interrelated areas: technical and educational.

The basic technical activity involves development, publication, and dissemination of consensus standards intended to minimize the possibility and effects of fire in all aspects of contemporary activity. More than 2400 individuals serve on the Association's committees, all on a voluntary, unpaid basis, and are responsible for approximately 260 standards.

Continuing efforts are directed at the general public of all ages to educate them in avoiding loss of life and property from fire by abiding by the standards and by making good firesafety habits a way of life. "Learn Not To Burn" is the theme and the teaching goal of the Association's general public education effort. This effort consists of a public service advertising campaign, a Learn Not To Burn educational center at NFPA's headquarters in Quincy, MA, and a school curriculum for grades K-8. Its Learn Not To Burn Curriculum is the first professionally developed educational program designed for classroom use in teaching firesafety to children.

Officers

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5709 Foggy Lane
Derwood, MD 20855

Jack P. Wells, Vice President
General Manager, Wiring Device Division
P.O. Box 4822
Syracuse, NY 13221

International Association of Black Professional Fire Fighters

5332 Kershaw Street
Philadelphia, PA 19131
212-866-6924

The International Association of Black Professional Fire Fighters was formed during the first convention of Black Professional Fire Fighters held in Hartford, Connecticut, October 1, 2, and 3, 1970.

Purpose and Aims

- Create a liaison between black fire fighters across the nation.
- Compile information concerning injustices that exist in the working conditions in the fire service, and to implement action to correct them.
- Collect and evaluate data on all deleterious conditions where minorities exist.
- See that competent Blacks are recruited and employed as fire fighters where they reside.
- Promote interracial programs throughout the fire service.
- Aid in motivating Black Brothers to seek advancement to elevated ranks.

The Organization is a life member of the National Association for the Advancement of Colored People.

Board Members

Charles Hendricks, President
5332 Kershaw St.
Philadelphia, PA 19131

Clarence Williams, Executive Vice Pres.
P.O. Box 22005
Seattle, WA 98122

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Clark Walker, Corresponding Secretary
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El Sobrante, CA 94803

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East Orange, NJ 07017

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New York, NY 10026

Romeo O. Spaulding, National Legislative Liaison
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Capitol Heights, MD 20743

Ronald J. Jenkins, Publicity
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Baltimore, MD 21215

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Queens Village, NY 11429

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Baltimore, MD 21217

South Central
Joseph Hughes
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St. Louis, MO 63108

North Central
Lee Bethune
911 Hardesty Blvd.
Akron, OH 44320

Southwest
John H. Wells
P.O. Box 361
Vallejo, CA 94590

National Volunteer Fire Council

45 Sussex Drive
Lewes, DE 19958
302-645-3225

The National Volunteer Fire Council was organized in 1976, and is an organization of state fire fighters' associations whose purpose is to represent and pursue the interests of volunteer fire fighters and fire departments throughout the United States. Among its objectives is (1) to provide a forum for the formulation of unified positions concerning developments nationally affecting volunteers, and (2) to support fire prevention education in the lower grades of school systems.

Officers

E. James Monihan, Chairman
45 Sussex Dr.
Lewes, DE 19958

Ron Miller, Vice Chairman
P.O. Box 34
Fairbank, IA 50629

John W. Condon, Treasurer
P.O. Box 337
Dallas, OR 97338

Gus Welter, Secretary
9944 Harriet Ave.
Bloomington, MN 55420

Past Meetings of Organizations with Fire Protection Interests

Conference of Fire Protection Associations (International)

1965 London, England
(organization meeting)
1966 Wiesbaden, Germany
1969 Stockholm, Sweden
1971 San Francisco, CA,
USA (in conjunction with NFPA Annual Meeting)
1973 Zurich, Switzerland
1975 Amsterdam, The Netherlands
1978 Paris, France
1982 Quincy, MA, USA

Fire Department Instructors' Conference

Held each year since 1939 in Memphis, TN

1983 March 13-17, Memphis, TN

International Association of Arson Investigators, Inc. (IAAI)

1949 thru 1964 March, West Lafayette, IN
1965 April 12-16, Ann Arbor, MI
1967 April 23-26, College Park, MD
1968 April 8-12, Columbus, OH
1969 April 14-18, Virginia Beach, VA
1970 April 6-9, Norman, OK
1971 April 25-30, Portland, OR
1972 April 9-14, Cocoa Beach, FL
1973 April 23-27, Des Moines, IA
1974 March 17-21, Austin, TX
1975 April 21-25, Lincoln, NE
1976 April 19-23, Indianapolis, MN
1977 May 1-6, Lansing, MI
1978 April 22-28, Anaheim, CA
1979 May 20-25, Williamsburg, VA
1980 March 10-14, Austin, TX
1981 March 30-April 3, Cherry Hill, NJ
1982 April 25-30, St. Louis, MO
1983 May 23-28, Tucson, AZ
1984 March 10-14, Vancouver, BC, Canada

International Association of Black Professional Fire Fighters

1970 Oct. 1-3, Hartford, CT
1972 Sept. 28-Oct. 2, St. Louis, MO
1974 Sept. 28-Oct. 2, Atlanta, GA
1976 Sept. 24-Oct. 1, San Diego, CA
1978 Sept. 15-22, Washington, DC
1980 Aug. 24-29, Detroit, MI
1982 Aug. 30-Sept. 3, Lexington, KY
1984 Aug. 27-31, Seattle, WA

International Association of Fire Chiefs (IAFC)

1873	Oct. 20-22, Baltimore, MD
1874	Oct. 5-8, St. Louis, MO
1875	Oct. 5-8, New York, NY
1876	Sept. 5-7, Philadelphia, PA
1877	Sept. 4-6, Nashville, TN
1878	Sept. 8-10, Cleveland, OH
1879	Sept. 9-12, Washington, DC
1880	Sept. 14-16, Boston, MA
1881	Sept. 13-15, Richmond, VA
1882	Sept. 12-15, Cincinnati, OH
1883	Oct. 24-27, New Orleans, LA
1884	Sept. 9-12, Chicago, IL
1885	Sept. 8-11, Long Branch, NJ
1886	Aug. 24-27, Providence, RI
1887	Sept. 20-23, Atlanta, GA
1888	Aug. 14-17, Minneapolis, MN
1889	Sept. 10-14, Kansas City, MO
1890	Aug. 19-22, Detroit, MI
1891	Aug. 11-14, Springfield, MA
1892	Oct. 4-7, Louisville, KY
1893	Aug. 22-25, Milwaukee, WI
1894	Aug. 14-17, Montreal, Quebec
1895	Oct. 7-9, Augusta, GA
1896	Aug. 10-12, Salt Lake City, UT
1897	Aug. 17-20, New Haven, CT
1898	Oct. 18-21, St. Louis, MO
1899	Aug. 22-25, Syracuse, NY
1900	Oct. 9-12, Charleston, SC
1901	Aug. 27-29, Indianapolis, IN
1902	Sept. 16-19, New York, NY
1903	Sept. 8-10, Atlantic City, NJ
1904	Sept. 13-15, Chattanooga, TN
1905	Aug. 16-19, Duluth, MN
1906	Oct. 9-12, Dallas, TX
1907	Oct. 8-11, Washington, DC
1908	Aug. 25-29, Columbus, OH
1909	Aug. 17-20, Grand Rapids, MI
1910	Aug. 23-24, Syracuse, NY
1911	Sept. 19-22, Milwaukee, WI
1912	Sept. 17-20, Denver, CO
1913	Sept. 1-6, New York, NY
1914	Oct. 20-23New, Orleans, LA
1915	Aug. 31-Sept. 3, Cincinnati, OH
1916	Aug. 29-31, Providence, RI
1917	Postponed (World War I)
1918	June 4-6, Chicago, IL
1919	June 24-27, Kansas City, MO
1920	July 26-29, Toronto, Ontario
1921	Oct. 11-14, Atlanta, GA
1922	Aug. 15-18, San Francisco, CA
1923	Oct. 23-26, Richmond, VA
1924	Aug. 19-22, Buffalo, NY
1925	Sept. 30-Oct. 2, Louisville, KY
1926	Oct. 19-22, New Orleans, LA
1927	Aug. 9-12, Portland, OR
1928	Oct. 17-20, Philadelphia, PA
1929	Oct. 22-25, Birmingham, AL
1930	Sept. 9-12, Winnipeg, Manitoba
1931	Oct. 14-17, Havana, Cuba
1932	Oct. 18-21, San Diego, CA
1933	Aug. 21-27, Cleveland, OH
1934	Aug. 21-24, Milwaukee, WI
1935	Sept. 24-27, Knoxville, TN
1936	July 28-31, Toronto, Ontario
1937	Oct. 19-22, Oklahoma City, OK
1938	Sept. 27-30, New Orleans, LA
1939	Sept. 20-23, San Francisco, CA
1940	Aug. 5-8, Spokane, WA
1941	Aug. 19-22, Boston, MA
1942	Postponed (World War II)
1943	Aug. 31-Sept. 3, Chicago, IL
1944	Aug. 28-31, Grand Rapids, MI
1945	Postponed (World War II)
1946	July 23-26, Cleveland, OH
1947	Aug. 19-22, New York, NY
1948	Nov. 9-12, Miami, FL
1949	Sept. 26-29, New Orleans, LA
1950	Sept. 12-15, San Francisco, CA
1951	Aug. 14-17, Grand Rapids, MI
1952	Aug. 25-28, Boston, MA
1953	Sept. 15-18, Toronto, Ontario
1954	Oct. 17-21, Houston, TX
1955	Sept. 19-22, Omaha, NE
1956	Nov. 12-15, Miami, FL
1957	Sept. 8-12, New Orleans, LA
1958	Sept. 8-12, Los Angeles, CA
1959	Aug. 31-Sept. 3, Grand Rapids, MI
1960	Sept. 12-15, Rochester, NY
1961	Sept. 26-28, Las Vegas, NV
1962	Sept. 24-27, Toronto, Ontario
1963	Oct. 28-31, Memphis, TN
1964	Oct. 19-22, Houston, TX
1965	Oct. 18-22, Miami, FL
1966	Aug. 22-25, Boston, MA
1967	Sept. 10-14, San Francisco, CA
1968	Sept. 25-Oct. 3, Louisville, KY
1969	Oct. 19-23, Chicago, IL
1970	Aug. 9-13, Seattle, WA
1971	Sept. 19-23, St. Louis, MO
1972	Sept. 10-14, Cleveland, OH
1973	Oct. 20-25, Baltimore, MD
1974	Sept. 15-19, Salt Lake City, UT
1975	Sept. 14-18, Las Vegas, NV
1976	Sept. 19-23, San Antonio, TX
1977	Sept. 25-29, Denver, CO
1978	Sept. 10-14, Cincinnati, OH
1979	Sept 16-19, Kansas City, MO

1980	Sept. 28-Oct. 1, Miami Beach, FL
1981	Sept. 13-16, St. Louis, MO
1982	Sept. 19-22, Philadelphia, PA
1983	Aug. 28-31, Atlanta, GA

Metropolitan Committee of the IAFC

(meets with main IAFC convention each year)

1966	Aug. 22-25, Boston, MA
1967	Sept. 10-14, San Francisco, CA
1968	Sept. 25-Oct. 3, Louisville, KY
1969	Oct. 19-23, Chicago, IL
1970	Aug. 9-13, Seattle, WA
1971	Sept. 19-23, St. Louis, MO
1972	Sept. 10-14, Cleveland, OH
1973	Oct. 20-25, Baltimore, MD
1974	Sept. 15-19, Salt Lake City, UT
1975	Sept. 14-18, Las Vegas, NV
1976	Sept. 19-23, San Antonio, TX
1977	Sept. 25-29, Denver, CO
1978	Sept. 10-14, Cincinnati, OH
1979	Sept. 16-19, Kansas City, MO
1980	Sept. 28-Oct. 1, Miami Beach, FL
1981	Sept. 13-16, St. Louis, MO
1982	Sept. 19-22, Philadelphia, PA
1983	Aug. 28-31, Atlanta, GA

International Association of Fire Fighters (IAFF)

1918	Washington, DC
1919	Portland, OR
1920	St. Louis, MO
1921	Columbus, OH
1922	Tulsa, OK
1923	Montreal, Quebec
1924	Kansas City, MO
1926	Philadelphia, PA
1928	Milwaukee, WI
1930	Halifax, Nova Scotia
1932	San Diego, CA
1934	Cedar Point, OH
1936	Asbury Park, NJ
1938	Atlanta, GA
1940	Des Moines, IA
1942	Columbus, OH
1944	Louisville, KY
1946	Toledo, OH
1948	Houston, TX
1950	Milwaukee, WI
1952	Seattle, WA
1954	Miami, FL
1956	Montreal, Quebec
1958	Wichita, KS
1960	Buffalo, NY
1962	San Antonio, TX
1964	San Diego, CA
1966	Indianapolis, IN
1968	Toronto, Ontario
1970	Miami, FL
1972	Los Angeles, CA
1974	Baltimore, MD
1976	Denver, CO
1978	Las Vegas, NV
1980	Toronto, Ontario
1982	Chicago, IL
1984	Cincinnati, OH
1986	Las Vegas, NV

International Fire Service Training Association (IFSTA)

Since its founding in 1934, IFSTA has met each July in Stillwater, OK. The regular meeting time now is the second week in July. The next meeting is July 11-14, 1983.

International Municipal Signal Association

1896	Sept. 15, Brooklyn, NY
1897	No record
1898	No record
1899	No record
1900	Sept. 25-27, Pittsburgh, PA
1901	Sept. 23-24, Niagara Falls, NY
1902	Oct. 7-9, Richmond, VA
1903	Sept. 2-4, Atlantic City, NJ
1904	Sept. 13-14, St. Louis, MO
1905	Aug. 23-25, Erie, PA
1906	Aug. 15-17, New Haven, CT
1907	July 7-9, Norfolk, VA
1908	Aug. 19-21, Detroit, MI
1909	Sept. 14-16, Atlantic City, NJ
1910	Sept. 6-9, Rochester, NY
1911	Sept. 12-15, Atlantic City, NJ
1912	Aug. 27-30, Peoria, IL
1913	Aug. 19-22, Watertown, NY
1914	Sept. 15-18, Atlantic City, NJ
1915	Aug. 24-27, Cincinnati, OH
1916	Aug. 22-25, Baltimore, MD
1917	Sept. 11-14, Niagara Falls, NY

1918	Sept. 24-27, Atlanta, GA
1919	Sept. 23-26, Chicago, IL
1920	Oct. 19-22, New Orleans, LA
1921	Sept. 6-9, Colorado Springs, CO
1922	Aug. 22-25, New Bedford, MA
1923	Sept. 25-28, Reading, PA
1924	Oct. 14-17, Augusta, GA
1925	Aug. 27-30, Detroit, MI
1926	Sept. 21-24, Asheville, NC
1927	Aug. 16-19 , Salt Lake City, UT
1928	Oct. 23-26, New Orleans, LA
1929	Aug. 20-23, Boston, MA
1930	Aug. 12-15, Denver, CO
1931	Oct. 27-30, Jacksonville, FL
1932	Sept. 13-16, St. Louis, MO
1933	Sept. 26-29, Wilkes-Barre, PA
1934	Aug. 29-Sept. 1, Washington, DC
1935	Oct. 14-16, Richmond, VA
1936	Aug. 31-Sept. 3, New York, NY
1937	Aug. 30-Sept. 2, Cleveland, OH
1938	Sept. 12-15, Baltimore, MD
1939	Oct. 9-12, Providence, RI
1940	Oct. 14-17, Jacksonville, FL
1941	Sept. 29-Oct. 2, St. Louis, MO
1942	Oct. 4-7, Philadelphia, PA
1943	Sept. 27-29, Cleveland, OH
1944	Oct. 2-5, Boston, MA
1945	Nov. 12-15, Chicago, IL
1946	Nov. 11-14, Miami, FL
1947	Sept. 29-Oct. 2, Grand Rapids, MI
1948	Oct. 4-7, Buffalo, NY
1949	Oct 10-13, Pittsburgh, PA
1950	Sept. 18-21, New York, NY
1951	Sept. 17-20, San Francisco, CA
1952	Sept. 29-Oct. 2, Boston, MA
1953	Oct. 5-8, Columbus, OH
1954	Oct. 4-7, Atlantic City, NJ
1955	Sept. 26-29, Rochester, NY
1956	Sept. 17-20, Denver, CO
1957	Sept. 16-19, Miami Beach, FL
1958	Oct. 20-23, Philadelphia, PA
1959	Oct. 19-22, Las Vegas, NV
1960	Sept. 19-21, New York, NY
1961	Oct. 9-11, Cincinnati, OH
1962	Sept. 24-26, Montreal, Quebec
1963	Oct. 3-6, Houston, TX
1964	Sept. 27-30, Atlantic City, NJ
1965	Oct. 3-6, Portland, OR
1966	July 31-Aug. 3, Chicago, IL
1967	Aug. 27-30, Baltimore, MD
1968	Aug. 18-21, Denver, CO
1969	Aug. 17-20, Boston, MA
1970	Aug. 2-5, Hollywood, FL
1971	Aug. 15-18, Los Angeles, CA
1972	July 30-Aug. 3, Montreal, Quebec
1973	Aug. 12-16, New Orleans, LA
1974	Sept. 22-26, Las Vegas, NV
1975	July 27-30, Atlantic City, NJ
1976	Aug. 29-Sept. 2, Miami Beach, FL
1977	Aug. 14-17, Baltimore, MD
1978	Aug 27-31, Dallas, TX
1979	Aug. 10-14, Toronto, Ontario
1980	Aug. 4-8, Philadelphia, PA
1981	July 19-24, Canton, OH
1982	Aug. 8-13, Nashville, TN
1983	Aug. 7-12, Portland, OR

International Society of Fire Service Instructors

Fall Conferences

1967	Baton Rouge, LA
1968	Ames, IA
1969	Dover, DE
1970	Clearwater, FL
1971	Memphis, TN
1972	Las Vegas, NV
1973	Morgantown, WV
1974	Anaheim, CA
1975	Boston, MA
1976	Silver Springs, MD
1977	Atlanta, GA
1978	Sioux Falls, SD
1979	Denver, CO
1980	Virginia Beach, VA
1981	Louisville, KY
1982	Hartford, CT
1983	Harrisburg, PA
1984	Houston, TX
1985	Boston, MA

National Fire Protection Association (NFPA)

Annual and Fall Meetings
(Annual Meetings in May)

1896	Nov. 6 (Org.), New York, NY
1897	May 19-20, New York, NY
1898	June 7-9, Chicago, IL
1899	June 13-15, Boston, MA
1900	June 26-28, New York, NY
1901	June 11-13, Chicago, IL
1902	May 13-15, Philadelphia, PA
1903	May 25-28, Chicago, IL
1904	May 24-26, New York, NY
1905	May 23-25, New York, NY

1906	May 22-24, Chicago, IL
1907	May 22-24, New York, NY
1908	May 26-28, Chicago, IL
1909	May 25-27, New York, NY
1910	May 17-19, Chicago, IL
1911	May 23-25, New York, NY
1912	May 14-16, Chicago, IL
1913	May 13-15, New York, NY
1914	May 5-7, Chicago, IL
1915	May 11-13, New York, NY
1916	May 9-11, Chicago, IL
1917	May 8-10, Washington, DC
1918	May 7-9, Chicago, IL
1919	May 6-8, Ottawa, Ontario
1920	May 4-6, Chicago, IL
1921	June 14-16, San Francisco, CA
1922	May 9-11, Atlantic City, NJ
1923	May 8-10, Chicago, IL
1924	May 13-15, Atlantic City, NJ
1925	May 12-14, Chicago, IL
1926	May 10-13, Atlantic City, NJ
1927	May 9-12, Chicago, IL
1928	May 7-10, Atlantic City, NJ
1929	May 13-16, Memphis, TN
1930	May 12-15, Atlantic City, NJ
1931	May 11-14, Toronto, Ontario
1932	May 9-12, Atlantic City, NJ
1933	May 29-June 1, Milwaukee, WI
1934	May 14-17, Atlantic City, NJ
1935	May 13-16, Atlanta, GA
1936	May 11-14, Atlantic City, NJ
1937	May 10-14, Chicago, IL
1938	May 9-12, Atlantic City, NJ
1939	May 8-12, Chicago, IL
1940	May 7-11, Atlantic City, NJ
1941	May 12-16, Toronto, Ontario
1942	May 11-14, Atlantic City, NJ
1943	May 10-13, Chicago, IL
1944	May 8-11, Philadelphia, PA
1945	June 26, Boston, MA
1946	June 3-7, Boston, MA
1947	May 26-29, Chicago, IL
1948	May 10-13, Washington, DC
	Oct. 28-29, Hartford, CT
1949	May 16-19, San Francisco, CA
	Nov. 1-2, Buffalo, NY
	Nov. 29-30, Atlanta, GA
1950	May 15-18, Atlantic City, NJ
	Nov. 15-17, St. Paul, MN
	Nov. 28-30, Dallas, TX
1951	May 7-11, Detroit, MI
	Oct. 24-25, Portland, OR
	Oct. 29-30, Los Angeles, CA
1952	June 9-13, New York, NY
	Dec. 1-3, Houston, TX
1953	May 11-15, Chicago, IL
	Oct. 29-30, Providence RI
1954	May 17-21, Washington, DC
	Sept. 20-22, Seattle, WA
1955	May 16-20, Cincinnati, OH
	Nov. 28-30, New Orleans, LA
1956	June 4-8, Boston, MA
	Nov. 26-28, St. Louis, MO
1957	May 20-24, Los Angeles, CA
	Nov. 18-20, Richmond, VA
1958	May 19-23, Chicago, IL
	Nov. 17-19, Pittsburgh, PA
1959	June 1-5, Atlantic City, NJ
	Nov. 11-13, Des Moines, IA
1960	May 16-20, Montreal, Quebec
	Nov. 14-16, Columbus, OH
1961	May 15-19, Detroit, MI
	Oct. 30-Nov. 1, Kansas City, MO
1962	May 21-25, Philadelphia, PA
	Oct. 15-17, Minneapolis, MN
1963	May 13-17, Portland, OR
	Dec. 2-4, Rochester, NY
1964	May 18-22, Dallas, TX
	Oct. 12-14, Louisville, KY
1965	May 17-21, Washington, DC
	Nov. 15-17, Los Angeles, CA
1966	May 16-20, Chicago, IL
	Nov. 14-16, Raleigh, NC
1967	May 15-19, Boston, MA
	Nov. 13-15, Omaha, NE
1968	May 20-24, Atlanta, GA
	Nov. 19-21, Milwaukee, WI
1969	May 12-16, New York, NY
	Nov. 18-20, Denver, CO
1970	May 18-22, Toronto, Ontario
	Nov. 17-19, Nashville, TN
1971	May 17-21, San Francisco, CA
	Nov. 16-18, Cleveland, OH
1972	May 15-19, Philadelphia, PA
	Nov. 14-16, New Orleans, LA
1973	May 14-18, St. Louis, MO
	Oct. 15-17, Geneva, Switz.
1974	May 20-24, Miami Beach, FL
	Nov. 19-21, Seattle, WA
1975	May 12-16, Chicago, IL
	Nov. 18-20, Pittsburgh, PA
1976	May 17-21, Houston, TX
	Nov. 15-18, Cincinnati, OH
1977	May 16-20, Washington, DC
	Nov. 14-17, Atlanta, GA
1978	May 15-19, Anaheim, CA
	Nov. 13-16, Montreal, Quebec
1979	May 14-18, St. Louis, MO

	Nov. 12-15, Phoenix, AZ
1980	May 19-23, Boston, MA
	Nov. 17-20, San Diego, CA
1981	May 18-21, Dallas, TX
	Nov. 16-19, Toronto, Ontario
1982	May 17-21, San Francisco, CA
	Nov. 15-18, Philadelphia, PA
1983	May 16-20, Kansas City, MO
	Nov. 14-17, Orlando, FL

National Volunteer Fire Council

1976	March 15-16, Memphis, TN
1977	March 19-20, Fort Mitchell, KY
1978	March 11-12, Hempstead, NY
1979	March 3-4, Grand Prairie, TX
1980	March 1-2, Austintown, OH
1981	April 11-12, West Des Moines, IA
1982	April 3-4, Edinburg, TX

Society of Fire Protection Engineers (SFPE)

1951	May 8, Detroit, MI
1952	June 12, New York, NY
1953	May 21, Chicago, IL
1954	May 20, Washington, DC
1955	May 19, Cincinnati, OH
1956	June 5, Boston, MA
1957	May 21, Los Angeles, CA
1958	May 20, Chicago, IL
1959	June 3, Atlantic City, NJ
1960	May 18, Montreal, Quebec
1961	May 17, Detroit, MI
1962	May 23, Philadelphia, PA
1963	May 15, Portland, OR
1964	May 20, Dallas, TX
1965	May 19, Washington, DC
1966	May 18, Chicago, IL
1967	May 17, Boston, MA
1968	May 22, Atlanta, GA
1969	May 14, New York, NY
1970	May 21, Toronto, Ontario
1971	May 19, San Francisco, CA
1972	May 17, Philadelphia, PA
1973	May 16, St. Louis, MO
1974	May 22, Miami Beach, FL
1975	May 14, Chicago, IL
1976	May 19, Houston, TX
1977	May 19, Washington, DC
1978	May 16, Anaheim, CA
1979	May 15, St. Louis, MO
1980	May 21, Boston, MA
1981	May 20, Dallas, TX
1982	May 19, San Francisco, CA
1983	May 18, Kansas City, MO

Organizations with Fire Protection Interests

Insurance Organizations

Alliance of American Insurers
20 North Wacker Dr.
Chicago, IL 60606
Paul S. Wise, President

American Hull Insurance Syndicate
14 Wall St.
New York, NY 10005
Allen E. Schumacher, Chairman of Board and Manager

American Institute of Marine Underwriters
14 Wall St.
New York, NY 10005
Thomas A. Fain, President

American Insurance Association
85 John St.
New York, NY 10038
T. Lawrence Jones, President

American Nuclear Insurers
270 Farmington Ave., Suite 245
Farmington, CT 06032
Burt C. Proom, President

Association of Mill and Elevator Mutual Insurance Companies
2 North Riverside Plaza
Chicago, IL 60606
D. D. Mauger, President and Director

Assurex International
6500 Busch Blvd.
Columbus, OH 43229
Gordon E. Noble, President

Cotton Fire and Marine Underwriters
1810 Commerce St.
P.O. Box 1849
Dallas, TX 75221
Walter H. McClain, Manager

Factory Mutual System
1151 Boston-Providence Turnpike
Norwood, MA 02062
J. A. Love, President

G.A.B. Business Services Inc.
123 William St.
New York, NY 10038
I. E. Williamson, Chairman

Improved Risk Mutuals
15 North Broadway
White Plains, NY 10038
Lovell M. Bolz, President

Independent Insurance Agents of America
85 John St.
New York, NY 10038
Donald C. Brain, President

Industrial Risk Insurers
85 Woodland St.
Hartford, CT 06102
J. W. Cates, President

Insurance Information Institute
110 Williams St.
New York, NY 10038
Mechlin D. Moore, President

Insurance Institute for Highway Safety
Watergate 600
Washington, DC 20037
William Haddon, Jr., President

Insurance Services Office
160 Water St.
New York, NY 10038
Daniel J. McNamara, President

Mill Mutual Fire Prevention Bureau
2 North Riverside Plaza
Chicago, IL 60606
D. D. Mauger, Manager

Mutual Atomic Energy Reinsurance Pool
One E. Wacker Dr.
Chicago, IL 60601
Roy Hammond, President

Mutual Reinsurance Bureau
1550 Pearl St.
P.O. Box 188
Belvidere, IL 61008
Walter Schiltz, President

National Association of Insurance Brokers, Inc.
1511 K St. NW, Suite 316
Washington, DC 20005
Earl C. Nelson, President

National Association of Insurance Commissioners
633 W. Wisconsin Ave., Suite 1015
Milwaukee, WI 53203
Wesley J. Kinder, President

National Association of Mutual Insurance Companies
7931 Castleway Dr.
Indianapolis, IN 46250
Harold W. Walters, President

National Association of Professional Insurance Agents
400 N. Washington St.
Alexandria, VA 22314
Louis Azus, President

National Automobile Theft Bureau
10330 S. Roberts Rd.
Palos Hills, IL 60482
Paul W. Gilliland, President

National Cargo Bureau, Inc.
Suite 2757
One World Trade Center
New York, NY 10048
Captain S. Fraser Sammis, President

Property Loss Research Bureau
20 N. Wacker Dr.
Chicago, IL 60606
Paul S. Wise, President

National Fire Service Organizations

Fire Marshals Association of North America (an NFPA Section)
600 Maryland Ave., SW
Washington, DC 20024
Robert B. Smith, Executive Secretary

Fire Service Section (an NFPA Section)
Batterymarch Park
Quincy, MA 02269
James V. McKiernan, Executive Secretary

International Association of Arson Investigators
P.O. Box 600
25 Newton St.
Marlboro, MA 01752
Robert E. May, Executive Secretary

International Association of Black Professional Fire Fighters
Office of the President
c/o New York Fire Department
24 Humboldt St.
Brooklyn, NY 11206
David J. Floyd, President

International Association of Fire Chiefs
1329 18th St., NW
Washington, DC 20036
Donald D. Flinn, General Manager

International Association of Fire Fighters
1750 New York Ave., NW
Washington, DC 20006
John A. Gannon, President

International Fire Service Training Association
Oklahoma State University
Stillwater, OK 74078
Samuel O. Goldwater, Editor

International Municipal Signal Association
P.O. Box 8249
Fort Worth, TX 76112
Robert J. Llewellyn, Executive Director

International Society of Fire Service Instructors
P.O. Box 88
Hopkinton, MA 01748
Edward J. McCormack, Jr., Executive Director

Joint Council of National Fire Service Organizations
National Fire Protection Association
Batterymarch Park
Quincy, MA 02269
Joseph M. Redden, Secretary

National Volunteer Fire Council
142 West River St.
Rockton, IL 60172
James Monihan, Chairman

Fire Research and Testing Laboratories

Factory Mutual Research Corporation
1151 Boston-Providence Turnpike
Norwood, MA 02062
J. A. Love, President

Southwest Research Institute
6220 Culebra Rd.
San Antonio, TX 78284

National Bureau of Standards Center for Fire Research
Gaithersburg, MD
Ernest Ambler, Director

Ohio State University
Columbus, OH

Underwriters Laboratories, Inc.
333 Pfingsten Rd.
Northbrook, IL 60062
J. A. Bono, President

Government Organizations

Agriculture, Department of
14th and Independence Ave., SW
Washington, DC 20250
John R. Block, Secretary

Commerce, Department of
14th and Constitution Ave., NW
Washington, DC 20230
Malcolm Baldrige, Secretary

Communications Commission, Federal
1919 M St., NW
Washington, DC 20554
Mark S. Fowler, Chairman

Consumer Product Safety Commission
1111 18th St., NW
Washington, DC 20207
Nancy Harvey Steorts, Chairman

Defense, Department of
The Pentagon
Washington, DC 20301
Caspar W. Weinberger, Secretary

Education, Department of
400 Maryland Ave., SW
Washington, DC
Terrel H. Bell, Secretary

Emergency Management Agency, Federal
1725 Eye St., NW
Washington, DC 20472
Louis O. Guiffrida, Director

Environmental Protection Agency
401 M St., NW
Washington, DC 20460
Ann McGill Gorsuch, Administrator

General Services Administration
18th and F Sts., NW
Washington, DC 20405
Gerald P. Carmen, Administrator

Health and Human Services, Department of
200 Independence Ave., SW
Washington, DC 20201
Richard S. Schweiker, Secretary

Housing and Urban Development, Department of
451 Seventh St., SW
Washington, DC 20410
Samuel R. Pierce, Jr., Secretary

Interior, Department of
C Street, between 18th and 19th St., NW
Washington, DC 20240
James G. Watt, Secretary

Justice, Department of
10th St. Constitution Ave., NW
Washington, DC 20240
William French Smith, Attorney General

Labor, Department of
200 Constitution Ave., NW
Washington, DC 20503
Raymond J. Donovan, Secretary

National Aeronautics and Space Administration
400 Maryland Ave., SW
Washington, DC 20546
James M. Beggs, Administrator

Nuclear Regulatory Commission
1717 H St., NW
Washington, DC 20555
Nunzio J. Pallidino, Chairman

Small Business Administration
1441 L St., NW
Washington, DC 20416
James C. Sandus, Administrator

Transportation, Department of
400 Seventh St., SW
Washington, DC 20590
Andrew L. Lewis, Secretary

Transportation Safety Board, National
800 Independence Ave., SW
Washington, DC 20594
James E. Burnett, Chairman

Treasury, Department of
15th St. and Pennsylvania Ave., NW
Washington, DC 20220
Donald T. Regan, Secretary

Veterans Administration
810 Vermont Ave., NW
Washington, DC 20420
Robert P. Nimmo, Administrator

Industrial Trade Associations

Air Conditioning and Refrigeration Institute
1815 North Fort Myer Dr.
Arlington, VA 22209
Richard C. Schulze, President

American Hard Board Products Association
887-B Wilmette Rd.
Palatine, IL 60067
James E. Nolan, Executive Vice President

American Gas Association
1515 Wilson Blvd.
Arlington, VA 22209
George H. Lawrence, President

American Iron and Steel Institute
1000 16th St., NW
Washington, DC 20036
Robert B. Peabody, President

American Petroleum Institute
2101 L St., NW

Washington, DC 20037
Charles J. DiBona, President

American Warehousemen's Association
222 West Adams St.
Chicago, IL 60606
Jerry Leatham, President

American Wood Preserves Institute
1651 Old Meadow Rd.
McLean, VA 22101
Theodore J. Duke, President

Asphalt Roofing Manufacturers Association
1800 Massachusetts Ave., SW, Suite 702
Washington, DC 20036

Automatic Fire Alarm Association
149 California St.
Newton, MA 02158
Martin Reiss, President

Builders Hardware Manufacturers Association
60 E. 42nd St.
New York, NY 10165
Clyde T. Nissen, Executive Director

Canadian Automatic Sprinkler Association
3638 Victoria Park Ave.
Willowdale, Ontario, Canada M2H 3B2

Canadian Sheet Steel Building Institute
305-201 Consumers Rd.
Willowdale, Ontario, Canada M2J 4G8

Canadian Wood Council
85 Albert St.
Ottawa, Ontario, Canada K1P 6A4

Central Station Electrical Protection Association
1441 Repub Building, Box 6778
Washington, DC 20005
Robert J. Daugherty, Executive Director

Chemical Manufacturers Association
2501 M St., NW
Washington, DC 20037
Robert A. Roland, President

Chemical Specialties Manufacturers Association, Inc.
1001 Connecticut Ave., NW
Washington, DC 20036
Ralph Engel, President

Chlorine Institute, Inc.
342 Madison Ave.
New York, NY 10017
Robert L. Mitchell, Jr., Executive Director

Compressed Gas Association, Inc.
500 5th Ave.
New York, NY 10036
Bernard K. Kuehn, President

Computer and Business Equipment Manufacturers Association
1828 L St., NW
Washington, DC 20036
Vico E. Henriques, President

Corn Refiners Association, Inc.
1001 Connecticut Ave.
Washington, DC 20006
Robert C. Liebenow, President

Distilled Spirits Council of the United States, Inc.
425 13th St., NW
Washington, DC 20004
Frederick K. Meister, Jr., President

Door and Hardware Institute
1815 North Ft. Myer Dr.
Rosslyn, VA 22209
Richard M. Hornaday, Executive Vice President

Ductile Iron Pipe Research Association
1301 W. 22nd St., Suite 509
Oak Brook, IL 60521
Troy F. Stroud, President

Electric & Electronic Manufacturing Association of Canada
One Yonge St., Suite 1608
Toronto, Ontario, Canada M5E 1R1

Fire Apparatus Manufacturers Division Truck Body and Equipment Association
5530 Wisconsin Ave., NW
Washington, DC 20015
Berkley C. Sweet, President

Fire Equipment Manufacturers Association
1230 Keith Bldg.
Cleveland, OH 44115
John Addington, Executive Director

Fire Equipment Manufacturers Institute of Canada
P.O. Box 73
Mississauga, Ontario, Canada L5G 4L5

Forging Industry Association
55 Public Square, Suite 1121
Cleveland, OH 44113
Robert W. Atkinson, Executive Vice President

Gas Appliance Manufacturers Association, Inc.
1901 North Fort Myer Dr.
Arlington, VA 22209
Harry A. Paynter, President

Gypsum Association
1603 Orrington Ave.
Evanston, IL 60201
A. Victor Abnee, Jr., Executive Director

Hardwood Plywood Manufacturers Association
P.O. Box 2789
Reston, VA 22090
Clark E. McDonald, Managing Director

Hydraulic Institute
712 Lakewood Center
North Lakewood, OH 44107
Allen P. Wherry, Secretary-Treasurer

Industrial Heating Equipment Association
1901 N. Moore St., #509
Arlington, VA 22209
James H. Houston, Executive Vice President

Industrial Truck Association
1326 Freeport Rd.
Pittsburgh, PA 15238
L. West Shea, Managing Director

Institute of Makers of Explosives
1575 Eye St., NW, Suite 550
Washington, DC 20005
P. Frederick Smith, Jr., Executive Director

International Association of Refrigerated Warehouses
7315 Wisconsin Ave.
Washington, DC 20014
Richard M. Powell, President

Laundry and Cleaners Allied Trades Association
543 Valley Rd.
Montclair, NJ 07143
Robert C. Knipe, Executive Director

Material Handling Institute, Inc.
1326 Freeport Rd.
Pittsburgh, PA 15238
Philip Trimble, Managing Director

Metal Building Manufacturers Association
2130 Keith Building
Cleveland, OH 44115
Charles M. Stockinger, General Manager

Motor Vehicle Manufacturers Association of the United States, Inc.
300 New Center Bldg.
Detroit, MI 48202
V. J. Adduci, President

National American Wholesale Grocers Association, Inc.
51 Madison Ave.
New York, NY 10010
Gerald E. Peck, President

National Association of Electrical Distributors
600 Summer St.
Stamford, CT 06901
Arthur W. Hooper, Executive Director

National Association of Fire Equipment Distibutors, Inc.
111 East Wacker Dr.
Chicago, IL 60601
Walter G. Purcell, Executive Director

National Association of Home Builders Technical Service
15th & M Sts., NW
Washington, DC 20005
David E. Stahl, Executive Vice President

National Automatic Sprinkler and Fire Control Association
P.O. Box 1000
Rt. 22 & Robin Hill Corp Park
Patterson, NY 12563
Edward J. Reilly, President

National Burglar and Fire Alarm Association, Inc.
1101 Connecticut Ave.
Washington, DC 20036
Michael Brown, Executive Director

National Electrical Manufacturers Association
2101 L St., NW
Washington, DC 20037
Bernard Falk, President

National Forest Products Association
1619 Massachusetts Ave., NW
Washington, DC 20036
Ralph D. Hodges, Executive Vice President

National LP-Gas Association, Inc.
1301 W. 22nd St.
Oak Brook, IL 60521
J. D. Capps, Executive Vice President

National Machine Tool Builders' Association
7901 Westpark Dr.
McLean, VA 22101
James A. Gray, President

National Oil Jobbers Council
1707 H St.
Washington, DC 20006
Phillip R. Chisholm, Executive Vice President

National Paint & Coatings Association, Inc.
1500 Rhode Island Ave., NW
Washington, DC 20005
Larry Thomas, Executive Director

National Restaurant Association
1 IBM Plaza, Suite 2600
Chicago, IL 60611
Robert E. Bradford, President

National School Supply and Equipment Association
1500 Wilson Blvd.
Arlington, VA 22209
Dave McCurrach, Executive Vice President

National Tank Truck Carriers, Inc.
1616 P St., NW
Washington, DC 20006
Clifford J. Harvison, Managing Director

National Woodwork Manufacturers Association, Inc.
205 West Touhy Ave.
Park Ridge, IL 60068
John W. Shoemaker, Executive Vice President

Portland Cement Association
5420 Old Orchard Rd.
Skokie, IL 60077
Richard Reuss, President

Power Tool Institute, Inc.
5105 Tollview Dr.
Rolling Meadows, IL 60008
James E. Bates, Executive Manager

Rubber Manufacturers Association, Inc.
1901 Pennsylvania Ave., NW
Washington, DC 20006
Donald G. Brotzman, President

Society of the Plastics Industry
355 Lexington Ave.
New York, NY 10017
G. R. Munger, President

Sporting Arms and Ammunition Manufacturer's Institute
P.O. Box 218
Wallingford, CT 06492
Harry L. Hampton, Jr.

Steel Tank Institute
666 Dundee Rd.
Northbrook, IL 60062

Terminal Elevator Grain Merchants' Association
Box 15004 Commerce Station
Minneapolis, MN 55415
Pete Stallcop, Executive Vice President

Thermal Insulation Manufacturing Association
7 Kirby Plaza
Mt. Kisco, NY 10549
James M. Barnhart, Executive Director

Presidents and Chief Officers of Fire Protection Associations

Conference of Fire Protection Associations (International)

Robert W. Grant, Chairman (CFPA)
National Fire Protection Association
Batterymarch Park
Quincy, MA 02269
(617) 328-9290

Philippe de Moulins, Secretary
c/o Centre national de Prevention et de Protection
5 Rue Daunou
75002 Paris, France

Fire Marshals Association of North America

(The Fire Marshals Section of the National Fire Protection Association)

Olin L. Greene, President
Oregon State Fire Marshal
Department of Commerce
103 Labor and Industries Building
Salem, OR 97310

Howard H. Summers, Jr., First Vice President
Chief Fire Marshal
Virginia Dept. of Housing and Community Development
205 N. Fourth St.
Richmond, VA 23219

W.W. Golden, Second Vice President
Chief, Bureau of Fire Prevention
1001 Senate St.
Columbia, SC 29201

Capt. William R. Rucinski, Secretary
Chief, Fire Marshal Division
Dept. of State Police, General Office Building
7150 Harris Dr.
Lansing, MI 48913

Robert B. Smith, Executive Secretary
c/o National Fire Protection Association
Capital Gallery, Suite 220
600 Maryland Ave., SW
Washington, DC 20024
(202) 484-8200

International Association of Arson Investigators

Louis H. Taranto, President
c/o New Jersey State Police
P.O. Box 248
Island Heights, NJ 08732

Robert Doran, First Vice President
c/o Nassau County Fire Marshal's Office
899 Jerusalem Ave.
Uniondale, NY 11553

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Before baseball became popular, fire fighting was considered an early American team sport. It provided excitement, risks, and an opportunity to display physical prowess publicly.

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WE WANT TO KNOW . . .
if a name, an address, or a phone number has changed; if there's an upcoming event, a new program or course, a new publication being offered. If you have more current information than is contained in this *Almanac*, know something that should be included in this book, or just have something interesting about the fire protection scene that you want to contribute, please let us know. Write: Editor, *Fire Almanac*, NFPA, Batterymarch Park, Quincy, MA 02269. All suggestions will receive our careful attention.

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Society of Fire Protection Engineers

Organized in 1950, the Society of Fire Protection Engineers (SFPE), with headquarters at 60 Batterymarch St., Boston, MA 02110, is the professional society for engineers involved in the multi-faceted field of fire protection engineering. The purposes of the Society are to advance the art and science of fire protection engineering and its allied fields, to maintain a high ethical standing among its members, and to foster fire protection engineering education. Its worldwide members include engineers in private practice, in industry, in local, regional, and national government, as well as technical members of the insurance industry. Thirty-five chapters of the Society are located in the United States, Canada, Europe, and Australia. Current membership is 3,000.

Membership in the Society is open to those possessing engineering or physical science qualifications coupled with experience in the field and to those in associated professional fields.

The Society serves as an international clearinghouse for fire protection engineering state-of-the-art advances and information. It publishes the *SFPE Bulletin*, a newsletter with regular features, and a series of "Technology Reports" covering technical developments of interest to the engineering community. It also publishes occasional special reports.

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Building Code Organizations

In the United States today, there are essentially three major model building code organizations. Each organization publishes a "nationally recognized" building code. All three organizations are membership organizations comprised either wholly, or mostly, of building officials.

Building Officials and Code Administrators International, Inc. (BOCA)
17926 S. Halsted St.
Homewood, IL 60430
(312) 799-2300

BOCA Codes primarily used in the northeast and midwest.
Chief Executive Officer: Clarence Bechtel, Executive Director.
Major publications include:
Basic Building Code
Basic Fire Prevention Code
Basic Mechanical Code
Basic Plumbing Code
Bi-monthly Magazine: "The Building Official," available to members and on a subscription basis.
Annual Meeting: June
Regional Offices:
3021 East Dublin-Granville Rd.
Columbus, OH 43229
(604) 890-1064

274 Lafayette Ave.
Hawthorne, NJ 07506
(201) 423-4003

International Conference of Building Officials (ICBO)
5360 S. Workman Mill Rd.
Whittier, CA 90601
(213) 699-0541

ICBO Codes primarily used in the west.
Chief Executive Officer: James E. Bihr, Executive Director
Major publications include:
Uniform Building Code
Uniform Fire Code
Uniform Mechanical Code
Uniform Plumbing Code

Bi-monthly Magazine: "Building Standards," available to members and on a subscription basis.
Annual Meeting: Usually late September or early October.
Regional Offices:
17544 Midvale Ave., N., Suite 304
Seattle, WA 98133
(206) 542-9421

6738 NW Tower Dr.
Kansas City, MO 64151
(816) 741-2241

Southern Building Code Congress International, Inc. (SBCCI)

900 Montclair Rd.
Birmingham, AL 35213
(205) 591-1853

Codes primarily used in the south.
Chief Executive Officer: William Tangye, Executive Director
Major publications include:
Standard Building Code
Standard Fire Prevention Code
Standard Gas Code
Standard Mechanical Code
Standard Plumbing Code
Standard Housing Code
Also serves as secretary for the CABO One- and Two-Family Dwelling Code.
Bi-monthly Magazine: "Southern Building," available to members only.
Annual Meeting: October

The three model building code organizations have formed a council referred to as "The Council of American Building Officials," (CABO). The board for this Council, referred to as the Board for the Coordination of Model Codes (BCMC), consists of representatives from the three model building codes and from the National Fire Protection Association. They work to coordinate and make parallel the three model building codes and related NFPA Codes, including the *Life Safety Code*.

In addition, CABO operates a certification program for building officials and the National Research Board dealing with product approval.

More detailed information on each of the model building code organizations is available through the specific organization.

Council of American Building Officials (CABO)

5205 Leesburg Pike, Suite 1201
Falls Church, VA 22041

Chief Executive Officer: Richard Kuchnicki, Executive Director
The Council reports through the model code groups.
Major publications include:
The One- and Two-Family Dwelling Code
Model Energy Code and Recommended Requirements to Code Officials
for Solar Heating, Cooling and Hot Water Systems.
Annual Meeting: April

Burn Care Services in the United States—1981

The following list includes hospitals at which physicians or administrators have reported the presence of a specialized burn care service in 1981. The hospitals are listed in directories prepared by the American Burn Association.

This list is intended to enable rapid communication between specialized burn services and to facilitate inter-regional referrals of burn patients. None of these sources address either the quality of burn care at a given institution or the optimum number of specialized beds and services in a given region. The inclusion of hospitals and physicians on this list therefore does not represent any direct or implied endorsement by the ABA or the NFPA of the burn care service they provide.

The telephone numbers provided may be located at the hospital switchboard, the emergency department, the burn care unit itself, or the physician's office. *Those using this list to refer a patient with burns should make clear the purpose of the call, in addition to asking for the physician listed or his designee.*

An asterisk (*) in the "Special Burn Beds" column indicates that there is no single area in that hospital designated solely for the treatment of burn patients.

About 21,500 acute inpatient burn admissions were recorded by 185 of the facilities on this list in 1980. This represents an increase of about 2% over 1979. About 80% of these patients were admitted to specialized burn units. The other 20% were admitted to non-specialized areas of hospitals with burn units, or to hospitals on the list which do not have burn units. The 21,500 admissions represent 30% of the estimated 70,000 annual acute inpatient burn admissions in the United States. Another 6,000 reconstructive burn admissions were reported by survey respondents: the number of such admissions nationally is unknown.

WE WANT TO KNOW . . .

if a name, an address, or a phone number has changed; if there's an upcoming event, a new program or course, a new publication being offered. If you have more current information than is contained in this *Almanac*, know something that should be included in this book, or just have something interesting about the fire protection scene that you want to contribute, please let us know. Write: Editor, *Fire Almanac*, NFPA, Batterymarch Park, Quincy, MA 02269. All suggestions will receive our careful attention.

BURN CARE SERVICES IN THE UNITED STATES

Source: American Burn Association

State	City	Hospital	Telephone Number for Patient Referral	Special Burn Beds	Burn Service Medical Director or M.D.s Most Active in Burn Treatment
Alabama	Birmingham	U. of Alabama Hospitals	205/934-3411	13	Alan R. Dimick
		Children's Hospital	205/933-4000	8	Marshall Pitts
	Fairfield	Lloyd Nolan Hospital and Clinics	205/783-5121	4	Harold R. Wells
	Mobile	U. of So. Alabama M.C. Hospital	205/473-0311	5	Byron E. Green Arnold Luterman
Alaska	Anchorage	Providence Hospital	907/276-4511	10	Robert E. Mallin W.J. Mills-hypothermia
	Fairbanks	Fairbanks Memorial Hospital	907/452-8181	4	William Wennen Richard Parry
Arizona	Phoenix	Maricopa County Gen. Hosp.	602/267-5700	20	John M. Stein
		PHS Indian Med. Ctr.	602/263-1200	5	Robert E.G. Norton Frank Zwemer
	Tucson	St. Mary's Hospital	602/795-8700	9	Philip Fleishman
Arkansas	Little Rock	Arkansas Child's Hospital	501/376-4621	12	Fred T. Caldwell
California	Berkeley	Alta Bates Hospital	415/845-7110	6	Jerold Z. Kaplan
	Castro Valley	Eden Hospital	415/537-1234	6	Ronald Iverson Eleanor Kohn
	Chico	Chico Comm. Mem. Hosp.	916/345-2411 or 916/342-7513	6	Donald J. Mangus
	Culver City	Brotman Medical Center	213/652-6630	23	Arthur M. Kahn
	Downey	Rancho Los Amigos Hospital	213/922-7454	*	G. Brody et al (Reconstructive only)
	Eureka	St. Joseph's Hospital	707/443-8051	*	Terry Knapp Russell Pardoe
	Fresno	Valley Medical Center	209/453-4161	6	Steven N. Parks
	Los Angeles	LAC/USC Medical Center	213/226-7991	38	Bruce E. Zawacki William T. Choctaw
	Orange	U. of C. Irvine Med. Ctr.	714/634-5304	13	Bruce M. Achauer
	Riverside	Riverside General Hospital	714/785-7160	4	Clifton Reeves

State	City	Hospital	Telephone Number for Patient Referral	Special Burn Beds	Burn Service Medical Director or M.D.s Most Active in Burn Treatment
	Sacramento	Sacramento Med. Ctr.	916/453-3636	8	Robert Demling
	San Bernardino	San Bernardino Community	714/887-6333 or 714/884-3612	5	David Hess
		San Bernardino Co. Med. Ctr.	714/383-3131	6	Donald Dressler David Sizemore
	San Diego	Univ. Hosp. U. of Cal. Medical Center	714/294-6502	14	Thomas Wachtel Hugh Frank
	San Francisco	St. Francis Mem. Hospital	415/775-4321	10	Edward Falces
		San Francisco Gen. Hosp.	415/821-8197	6	Donald D. Trunkey
	San Jose	Santa Clara Valley Med. Ctr.	408/279-5452	12	R. L. Berkowitz
	San Luis Obispo	San Luis Obispo Gen. Hosp.	805/543-1500	5	Jerren Jorgensen et al
	San Pablo	Brookside Hospital	415/235-7000	6	Robert L. Shapiro
	Sherman Oaks	Sherman Oaks Comm. Hosp.	213/981-7111	30	A. Richard Grossman
	Stockton	Dameron Hospital	209/944-5550	12	Genest de L'Arbre
	Torrance	Torrance Memorial Hospital	213/325-9110	10	Leslie Lee
Colorado (organized as the Colorado burn injury network)	*Burn Units*				
	Denver	Children's Hospital	303/861-6906	8	William Carl Bailey
		University Hospital	303/394-8400	5	John Hansbrough
	Burn Facilities				
	Colorado Springs	Penrose Hospital	303/630-5770	8	Alfred J. Martin, Jr.
Colorado	Denver	St. Anthony's Hospital	303/629-4355	*	Ian Winspur
	Grand Junction	St. Mary's Hospital	303/242-9127	*	William Merkel
	Greeley	Weld County Gen. Hospital	303/352-4121	*	James R. Wheeler
	Pueblo	St. Mary-Corwin Hospital	303/561-5000	*	Clifford Hoyle
Connecticut	Bridgeport	Bridgeport Hospital	203/384-3000	9	Michael L. D'Aiuto
	Hartford	Hartford Hospital	203/524-2515	*	Philip E. Trowbridge et al
	New Haven	Yale-New Haven Hospital	203/436-4404	*	William Frazier Charles Cuono
District of Columbia	Washington	Children's Hosp. National Medical Center	202/745-5016	12	Judson G. Randolph
		Washington Hosp. Center	202/541-7241 or 202/541-6662	27	Marion Jordan

Florida	Gainesville	Shands Teaching Hospital	904/392-3055	6	Hal G. Bingham
	Jacksonville	University Hospital	904/358-3272	*	Sam Stephenson Jr.
	Miami	Jackson Memorial Hospital	305/325-7085	8	C. Gillon Ward
	Orlando	Orlando Reg. Med. Ctr.	305/841-5176	7	Patricio Quijada
	Tampa	Tampa General Hospital	813/253-0711 or 813/251-7617	18	C. Wayne Cruse
Georgia	Albany	Phoebe Putney Hospital	404/887-1800	6	Van C. Knowles
	Atlanta	Grady Mem. Hospital	404/588-4307	30	H. Harlan Stone (Fulton & DeKalb Cty. only)
		St. Joseph's Hospital	404/256-7165	*	Patrick Shea, Jr.
	Augusta	Doctor's Hospital	404/863-3232	10	Alton Garrison Joseph Still
		Eugene Talmadge Mem. Hosp. Med. Coll. of Georgia	404/722-0070	6	Richard C. Treat
	Columbus	Medical Center	404/324-4711	6	Robert K. Worman (Acting)
Illinois	Chicago	Children's Memorial Hosp.	312/649-4094	*	Desmond Kernahan Victor Lewis
		Cook County Hospital	312/633-6564 312/633-6570	30	Takayoshi Matsuda Marella Hanumadass
		Edgewater Hospital	312/878-6000	4	Ramesh Kharwadkar
		U. of Chicago Hospital	312/947-6965	20	Martin Robson
	Evanston	Evanston Hospital	312/492-7720	8	Charles Drueck
	Maywood	Foster G. McGaw Hospital, Loyola U. of Chicago	312/531-3988	14	Raymond Warpeha
	Rock Island	R.I. Franciscan Hospital	309/793-3173	10	Frank E. Miller
	Rockford	St. Anthony's Hospital	815/226-2000	8	Edward H. Sharp
	Springfield	Memorial Medical Center	217/788-3325	10	Jack Baldwin
Indiana	Fort Wayne	St. Joseph's Hospital	219/422-9387	7	Jack Patterson
	Indianapolis	J. W. Riley Hospital	317/264-3927	8	Bernard L. Swartz (children)
		W. N. Wishard Mem. Hosp.	317/630-6471	8	David J. Smith (adults)
Iowa	Iowa City	U. of Iowa Hosp. & Clinics	319/356-2496	13	Albert E. Cram
	Sioux City	St. Luke's Medical Center	712/279-3440	8	Larry D. Foster
Kansas	Kansas City	U. of Kansas Med. Ctr.	913/588-6540	10	Mani M. Mani David W. Robinson
	Wichita	St. Francis Hospital	316/262-3495	*	Tommy E. Kendall et al
		Wesley Medical Center	316/688-2688	*	Richard C. Shaw et al

State	City	Hospital	Telephone Number for Patient Referral	Special Burn Beds	Burn Service Medical Director or M.D.s Most Active in Burn Treatment
Kentucky	Lexington	University Hospital	606/233-5260	4	Edward Luce
	Louisville	Norton-Child's Hospital (Admits Adult Burns)	502/589-8000	8	Harry D. Stambaugh et al
Louisiana	Baton Rouge	Baton Rouge Gen. Hospital	504/387-7716	14	D. V. Cacioppo
	Marrero	West Jefferson Hospital	504/347-5511	14	Frank C. DiVincenti
	New Orleans	Charity Hospital of Louisiana	504/568-2311	4	Frank C. DiVincenti
	Shreveport	L.S.U. Med. Ctr. Hospital	318/674-6133	12	Edwin Deitch
Maine	Bangor	Eastern Maine Med. Ctr.	207/947-3711	*	Charles Dixon
	Lewiston	Central Maine Med. Ctr.	207/795-0111	*	Alan Ingraham
	Portland	Maine Medical Center	207/871-2991	6	Richard Britton
	Presque Isle	Arthur Gould Mem. Hosp.	207/769-2511	*	Raymond Giberson
Maryland	Baltimore	Baltimore City Hospital	301/396-8765	21	Andrew Munster
Massachusetts	Boston	Beth Israel Hospital	617/735-2000	3	Joel Noe Mark Weinstein
		Boston City Hospital	617/424-5204	*	Erwin Hirsch
		Brigham & Women's Hospital	617/732-7712	10	Douglas W. Wilmore
		Mass. General Hospital	617/726-3354	10	John F. Burke
		Shriners Burns Institute	617/722-3000	30	John P. Remensnyder
	Springfield	Baystate Medical Center	413/787-4380	*	Manu H. Desai
Michigan	Ann Arbor	Michigan Burn Center -University Hospital -St. Joseph Mercy Hospital -Chelsea Comm. Hosp.	313/995-BURN	29	Irving Feller Jai K. Prasad
	Detroit	Children's Hosp. of Mich.	313/494-5678	12	James Lloyd
		Detroit Receiving Hospital	313/494-3374	18	Eti Gursel
	Flint	Hurley Medical Center	313/766-0188 or 313/238-3626	13	Musa Haffajee et al
	Grand Rapids	Blodgett Mem. Med. Ctr.	616/774-7670	8	William Simpson Richard A. Wehrenberg
	Kalamazoo	Bronson Methodist Hosp.	616/383-6485 or 1-800/632-3403	14	Frank J. Newman Paul Fierke

	Lansing	Edward R. Sparrow Hosp.	517/487-2774	4	Errikos Constant Jorge Gomez
	Marquette	Marquette Gen. Hosp.	906/228-9440	*	James Keplinger Constance N. Arnold
	Saginaw	St. Mary's Hospital	517/790-5055	6	Syed Akhtar
Minnesota	Duluth	Miller Dawn Hosp. & Med. Ctr.	218/727-8762	12	John W. Wolf
	Minneapolis	Minneapolis Children's Health Ctr. & Hosp.	612/871-4551	*	F. A. McParland
		Hennepin Co. Med. Ctr.	612/347-2915	11	John Twomey
		North Mem. Med. Ctr.	612/588-0616	6	Fereydoon Mahjouri
	Rochester	St Mary's Hospital	507/285-5123 or 507/285-5591	6	George B. Irons (adults) Robert Telander (children)
	St. Paul	St. Paul-Ramsey Med. Ctr.	612/221-3351	24	Lynn D. Solem
Mississippi	Greenville	Delta Medical Center	601/378-3783	10	Robert Love
	Jackson	University Hospital	601/987-3916 or 601/987-5566	4	Frederick R. Heckler
Missouri	Columbia	U. of Mo. Health Sciences Center	314/882-7994	7	Boyd E. Terry
	Kansas City	Children's Mercy Hosp.	816/234-3520	6	Raymond Amoury
	St. Louis	Barnes Hospital	314/454-3244	6	William H. Monafo
		Cardinal Glennon Mem. Hosp.	314/865-4000	*	F. X. Paletta
		St. John's Mercy Med. Ctr.	314/569-6055	17	Vatche H. Ayvazian Dan F. Kopen
	Springfield	St. John's Regional Health Ctr.	417/885-2876	9	Mark Wittmer
Montana	Billings	Saint Vincent Hospital	406/657-7067	*	David F. Sloan
Nebraska	Lincoln	St. Elizabeth Comm. Health Ctr.	402/489-7181 or 402/483-9206	10	Ro[illegible]rt W. Gillespie
Nevada	Las Vegas	Southern Nevada Mem. Hosp.	702/384-7979	9	John Batdord
New Jersey	Hackensack	Hackensack Hospital	201/487-4000	*	Anthony Barbara
	Livingston	St. Barnabas Med. Ctr.	201/533-5920	12	Frederick Fuller
	Trenton	St. Francis Medical Centre	609/396-7676	*	John Flood
New Mexico	Albuquerque	U. of New Mexico Hospital	505/843-2111	12	William R. Schiller
New York	Albany	Albany Medical Center	518/445-3010	9	Richard M. McShane Dhiraj M. Shah

State	City	Hospital	Telephone Number for Patient Referral	Special Burn Beds	Burn Service Medical Director or M.D.s Most Active in Burn Treatment
	Binghamton	Binghamton General Hospital	607/772-1100	4	Guiseppe Moscatelli
	Buffalo	Children's Hospital	716/878-7301, 7435	*	Theodore Jewett Donald R. Cooney
		Millard Fillmore Hospital	716/887-4776	4	Evan J. Evans
		Sheehan Mem. Emerg. Hosp.	716/842-2200	10	Louis C. Cloutier
	East Meadow	Nassau County Med. Ctr.	516/542-3207	10	Leonard Rubin Roger L. Simpson
	Elmira	St. Joseph's Hospital	607/733-6541	4	James Marshall James Sonsire
	New York City:				
	Bronx	Bronx Municipal Hosp. Ctr.	212/430-8065	12	Jane Petro
	Brooklyn	Kings County Hospital	212/630-3131	5	Winston Mitchell
	Manhattan	Harlem Hospital Ctr.	212/694-1335	7	Vincent Porter
		NY Hosp.-Cornell Med. Ctr.	212/472-5132	24	David N. Herndon (acting)
		St. Vincent's Hospital	212/790-8940	6	Ronald N. Ollstein
	Rochester	Strong Memorial Hosp.	716/275-5475	9	Robert M. McCormack
	Syracuse	Upstate Medical Center	315/473-6083	6	William Clark
	Valhalla	Westchester Co. Med. Ctr.	914/347-4909	10	Roger E. Salisbury
	West Islip	Good Samaritan Hospital	516/321-2000	*	Richard A. Giery
North Carolina	Chapel Hill	N. Carolina Mem. Hospital	919/966-4131	23	G. Peter Dingeldein (acting)
	Durham	Duke University Hospital	919/681-2404	9	Gregory Georgiade Joseph Moylan
	Winston-Salem	N.C. Baptist Hospital	919/748-2011	6	Jesse H. Meredith Connell Shearin
North Dakota	Fargo	St. Luke's Gen. Hospital	701/280-5504	4	David W. Todd
Ohio	Akron	Children's Hosp. Med. Ctr. (Admits Adult Burns)	216/379-8224	12	C.R. Boeckmann R.L. Klein
	Cincinnati	U. of Cincinnati Hosp.	513/872-3100	10	Robert P. Hummel
		Shriners Burns Institute	513/751-3900	30	Bruce G. MacMillan
	Cleveland	Cleveland Metro. Gen. Hosp.	216/459-5627	16	Richard Fratianne
	Columbus	Children's Hospital	614/461-2000	14	E. Thomas Boles
		Ohio State Univ. Hospital	614/422-4516	3	Robert Ruberg

	Dayton	Children's Med. Ctr.	513/226-8300	4	Charles D. Goodwin
		Miami Valley Hospital	513/223-6192	4	R.K. Finley Sidney Miller
	Toledo	St. Vincent's Hospital	419/259-4098	8	George Baibak
Oklahoma	Oklahoma City	Baptist Medical Center	405/949-3345	15	Paul Silverstein
		Oklahoma Children's Mem. H.	405/271-4733	12	E. Ide Smith
	Tulsa	Hillcrest Medical Center	918/584-1351	28	Harold F. Dunlap
Oregon	Portland	Oregon Burn Center (at Emanuel Hospital)	503/280-4233	12	Philip Parshley
Pennsylvania	Allentown	Allentown & Sacred Heart Hospital Center	215/821-2058	6	Walter J. Okunski
	Chester	Crozer-Chester Med. Ctr.	215/876-0356	19	Charles E. Hartford
	Danville	Geisinger Medical Center	717/271-6353 or 717/271-6591	4	Philip C. Breen
	Erie	Hamot Medical Center	814/455-0066	8	Charles R. Bales Forrest C. Mischler
	Hershey	Hershey Medical Center	717/534-8521	*	William P. Graham
	Philadelphia	Saint Agnes Medical Ctr.	215/339-4339	11	Frederick A. DeClement
		St. Christopher's Hosp. for Children	215/427-5000	4	Stuart J. Hulnick
	Pittsburgh	Mercy Hospital	412/232-8225	7	Thomas Layton
		Western Pa. Hospital	412/682-4200	18	John Gaisford
	York	York Hospital	717/771-2345	6	Robert Davis Richard W. Dabb
South Carolina	Charleston	Medical Univ. Hospital	803/792-3681	9	Dabney R. Yarbrough (adult)
			803/792-3851	*	H. Biemann Othersen Jr. (ch.)
Tennessee	Chattanooga	Baroness Erlanger Hosp.	615/755-7881	6	John R. Reynolds
	Memphis	City of Memphis Hospital	901/528-7100	*	J. Garnett Murphy Charles White
	Nashville	Vanderbilt U. Hospital	615/322-7311	20	John B. Lynch/J. O'Neill
Texas	Austin	Brackenridge Hospital	512/476-6461	*	Robert A. Ersek et al
	Beaumont	Baptist Hospital	713/835-3781	10	Duane Larson Wesley Washburn
	Corpus Christi	Memorial Medical Center	512/844-4511	9	Robert H. Balme
	Dallas	Parkland Memorial Hospital	214/638-1800 or 214/688-3754	30	John Hunt

State	City	Hospital	Telephone Number for Patient Referral	Special Burn Beds	Burn Service Medical Director or M.D.s Most Active in Burn Treatment
	El Paso	Sun Towers Hospital	915/532-6281	12	Charles Lyon et al
	Fort Sam Houston	Brooke Army Medical Ctr.	512/221-4604	40	Basil A. Pruitt, Jr.
	Fort Worth	John Peter Smith Hospital	817/921-3431	*	Charles Crenshaw et al
	Galveston	John Sealy Hospital	713/765-1255 (Days) 713/765-2023 (Nights)	15	Steven J. Blackwell
		Shriners Burns Institute	713/765-2516	30	Donald H. Parks
	Houston	Ben Taub Gen. Hospital	713/791-7000	8	Frank Gerow
		Hermann Hospital	713/792-5406	13	David E. Beesinger
	San Antonio	Bexar County Hospital	512/696-3030 or 512/691-6151	*	A.B. Cruz, Jr.
Utah	Salt Lake City	U. of Utah Hospital	801/581-2700	12	Glenn Warden Scott Peterson
Vermont	Burlington	Med. Ctr. Hosp. of Vermont	802/656-4545	*	John Davis Richard Gamelli
Virginia	Charlottesville	U. of Virginia Med. Ctr.	804/924-5520	6	Richard Edlich
	Norfolk	Norfolk Gen. Hospital	804/628-3117	8	Willcox Ruffin et al
	Richmond	Med. Coll. of Virginia Hosp.	804/786-9240	12	Boyd W. Haynes
Washington	Olympia	St. Peter Hospital	206/491-9480	*	Sherwood Smith et. al.
	Seattle	Harborview Med. Ctr.	206/223-3127	40	David Heimbach
	Spokane	Sacred Heart Med. Ctr.	509/455-3344	*	James Brinkman et al
	Tacoma	St. Joseph's Hospital	206/627-4101 or 206/596-6677	10	Thomas J. Irish
West Virginia	Huntington	Cabell-Huntington Hospital	304/696-6110	4	James A. Coil, Jr.
Wisconsin	Madison	U. of Wisconsin Hosps.	608/263-1490 or 608/263-1387	7	Richard Helgerson
	Milwaukee	St. Mary's Hospital	414/289-7000	20	George Collentine
	Neenah	Theda Clark Memorial Hospital	414/725-4311	*	Eugene Schrang

Fire Protection Consultants

The following list of fire protection consultants is arranged by state and specialty. The list was obtained by an NFPA survey of the Association's master list of consultants. If your firm is not listed here and would like to be included on this list in the 1984 FIRE ALMANAC, please send the name, address, phone number, and any specialties of your firm to:

Editor
Fire Almanac
Batterymarch Park
Quincy, MA 02269

State	Specialty
California	
John F. Behrens, Fire Protection Engineer, Code Consultant 7222 Deep Harbor Dr. Huntington Beach 92648 (714) 960-1538	Life Safety Code; Uniform Building Code; Model Building Codes
Bergstrom Consulting Engineers, Inc. 680 Warren St. Redwood City 94063 (415) 368-3277	Fire protection consultants and design
William E. Busby, Consulting Engineer Keystone Building Mill Valley 94941 (415) 388-6321	Fire origin and cause investigations
Haden B. Brumbeloe and Associates and Fire Protection Contractor Mail: P.O. Box 606 Danville 94526 Shipping: 1850 Lacassie, Suite 5 Walnut Creek 94596 (415) 939-7271	Fire protection piping systems; litigation-expert witness, management consultant to sprinkler contractors
John G. Degenkolb 1720 Chevy Knoll Dr. Glendale 91206 (213) 245-3075	Fire Protection Engineer/Code Consultant
Harry S. Dixon, Ph. D.—Engineers 130 Jessie St. San Francisco 94105 (415) 495-3406	Fire cause determination by investigation and/or tests and analysis

State	Specialty
The FPE Group 649 Mission St. San Francisco 94105 (415) 495-3310	Worldwide consulting engineering services in hazard analysis, risk management, safety management, system design, boiler's machinery loss control
Gage-Babcock and Associates, Inc. 5525 E. Seventh St. Long Beach 90804 (213) 597-0303	Consulting and engineering services in fire protection, security and safety
Gage-Babcock and Associates, Inc. 1440 Broadway, Suite # 308 Oakland 94612 (415) 465-2557	Consulting and engineering services in fire protection, security and safety
James E. Hill, PE FPE 3601 Viá La Selva Palos Verdes Estates 90274 (213) 375-2689	Flammable liquids; LP Gas; Gas
Rolf Jensen and Associates, Inc. 620 Contra Costa Blvd., Suite 209 Pleasant Hill 94523 (415) 680-0350 J. Quiter, PE P. Schontag, PE J. Simms, PE	Code consulting; system design; industrial survey; municipal
James R. Gaskill, PE 875 Estates St. Livermore 94550 (415) 447-3417	Smoke hazards; smoke damage fire terminology—chemical engineering
Schirmer Engineering Corp. *Western Office* 367 Civic Dr., Suite 6 Pleasant Hill 94523 (415) 827-5858	Code consultation; suppression system design; fire and security; design; loss control engineering
Sierra Consultants International 649 Mission St. San Francisco 94105 (415) 777-3855 Telex: 181159 (LSA)	Fire and explosion engineering and technology
Colorado	
Aspen Engineering, Inc. P.O. Box 4338 Woodland Park 80863 (303) 687-3487	Fire protection engineering and code consulting

State	Specialty
Diliberto and Associates 1133 Race St., 75 P.O. Drawer F Denver 80218 (303) 321-7439	Fire protection and safety engineering consulting
Connecticut	
William H. Doyle 36 Massacoe St. Simsbury 06070 (203) 658-5198	Chemical plant explosions and fires; investigation and prevention
Alan Lipschultz, MS, PE Waterbury Hospital 64 Robbins St. Waterbury 06721 (203) 573-7194	Clinical engineering; electrical safety in hospitals
Washington, DC	
Howard M. Markman 1201 Connecticut Ave., NW Washington DC 20036 (202) 775-8012	Attorney-At-Law/Fire Protection Consultant
Florida	
William Alvine Associates, Inc. P.O. Box 340041 Boca Raton 33434 (305) 487-2782	Fire and explosion analysts; forensic science laboratory; engineering services
William Alvine Associates, Inc. 31 Cypress Way Casselberry 32707 (305) 339-3473	Fire and explosion analysts; forensic science laboratory; engineering services
Gage-Babcock and Associates, Inc. 10021 SW 133rd St. Miami 33176 (305) 235-4696	Consulting and engineering services in fire protection, security and safety
Alfred J. Hogan, PE Fire Protection Engineer/Code Consultant P.O. Box 30 Cypress Gardens 33880 (813) 324-4893	Fire protection engineering including fire investigation and code consulting

State	Specialty
Rimbey, Howell and Rimbey, Inc. Consulting Engineers 10730 N. 56th St. P.O. Box 16189 Tampa 33687 (813) 988-1821	Fire and explosion investigations; reconstruction; arson determination; causation
Idaho	
William W. Miller, Fire Protection Consultants P.O. Box 691 Sun Valley 83353 (208) 788-4103	Fire protection planning; architectural code specialist; development site planning; systems design; municipal master planning for fire protection
Illinois	
A. Lynn Anderson and Associates Heritage Office Building 800 N. Main Antioch 60002 (312) 395-7456	Fire retardant chemicals; fire retardant thermoplastics
Camplin, Bartels, Erickson and Associates, Inc. P.O. Box 7159 Chicago 60680 (312) 951-5686	Healthcare life safety and loss control
3M Engineering Analyst Ltd. Henry S. Morton, Cdr., USN (Ret.) 118½ N. 4th Ave. St. Charles 60174 (312) 583-3034	Registered engineer specializing in cause of loss pertaining to explosion, fire, combustion dynamics, and marine and mechanical engineering
Gage-Babcock and Associates, Inc. 135 Addison Ave. Elmhurst 60126 (312) 530-1494	Consulting and engineering services in fire protection, security and safety
Rolf Jensen and Associates, Inc. 104 Wilmot Rd., Suite 201 Deerfield 60015 (312) 948-0700 R. Adcock, PE J. Antell, PE W. Ault, PE R. Bellman, PE G. Clarke, PE R. Daniels, PE R. Gerdes, PE R. Jensen, PE	Fire protection engineering; building code consulting; equivalency analysis; detection—alarm—extinguishing system design J. Lewin, PE C. March, PE R. Mazzone, PE M. Petersen, PE L. Strull, PE R. Transue, PE F. Van Overmeiren, PE P. Yurkonis, PE

State	Specialty
Illinois	
M&M Protection Consultants Marsh and McLennan Plaza 222 S Riverside Chicago 60606 (312) 648-6821	Industrial fire protection; business interruption interdependency analysis; emergency planning; auditing of fire protection management
NATLSCO (National Loss Control Service Corp.) Kemper Center Long Grove 60049 (312) 540-3465	Fire protection engineering; industrial and municipal
James W. Nolan Company 999 E. Touhy Ave. Des Plaines 60018-2787 (312) 299-4020	Fire protection water supply, i.e. standpipe design and fire pump specialists
Polytechnic, Inc. 3740 Morse Ave. Chicago 60645 (312) 677-0450	Combustion, fire and explosion investigations
Schirmer Engineering Corp. 707 Lake Cook Rd. Deerfield 60015 (312) 272-8340	Code Consultation; suppression system design; fire and security design; loss control engineering
Richard H. Solomon, PE Fire Protection Engineering 356 S. Loomis St. Naperville 60540 (312) 355-6606	Public fire suppression systems; building/fire prevention codes analysis; land planning and use—fire prevention
Lansing B. Warner, Inc. 4300 Peterson Ave. Chicago 60646 (312) 736-1400	Insurers and insurance consultants to the food industry
Fred J. Zeleny 800 N. Delphia Park Ridge 60068 (312) 823-6907	Consultant on general fire protection, electrical equipment in extra hazardous locations and nuclear power plants
Iowa	
Diedrichs and Associates 2804 Walnut St. Cedar Falls 50613 (319) 266-6257	Electrician and mechanical engineering; consulting; design and testing

State	Specialty
Doerfer Division 201 Washington St. Cedar Falls 50613 (319) 277-3110	General engineering design
Louisiana	
Thompson Consultant 1510 Kabel Dr. New Orleans 70114 (504) 392-1227	
Maryland	
Benjamin/Clarke Associates, Inc. 10605 Concord St., Suite 501 Kensington 20895 (301) 949-1414	Fire risk analysis, including non-routine testing and combustion product toxicity; mathematical fire modeling and development of equivalency systems
Rothfuss Engineering Corp. P.O. Box 97 Columbia 21044 Columbia (301) 997-7437 DC (301) 621-5599	Fire protection services; facilities protection (buildings, ships); investigations (fire/arson, equipment/system failure analysis)
Forensic Technologies International (formerly CADCOM Forensic Engineering Directorate) 107 Ridgely Ave. Annapolis 21401 (301) 268-1100	Fires; explosion; cause determination; fire protection systems
Hanna Engineering Corp. Hampton House, Suite 702 204 E. Joppa Rd. Baltimore 21204-3048 (301) 321-8824	Life safety and fire protection consulting
Hughes Associates, Inc. 10605 Concord St., Suite 501 Kensington 20895 (301) 949-0505	Fire protection engineering
Marshall A. Klein and Associates, Inc. 6815 Autumn View Dr. Eldersburg 21784 (301) 781-6474	Fire Protection Engineers/Building Code Consultants

State	Specialty
Morris and Ward Box 30237 Bethesda 20814 (301) 320-4900	Safe egress; fire protection building security
Systems Technology, Inc. 32 Castle Ct. Gaithersburg 20878 (301) 948-7354	Fire protection; engineering management; expert witness services
Joseph K. Taussig, Jr., Consultant 400 Ridgely Ave. Annapolis 21401 (301) 268-3654	Specifying and leading clients to the attainment of actual commercially available, state-of-the-art materials capable of withstanding at least 1200 C.
Massachusetts	
G.F. Charette and Associates, Inc. 279 Cambridge St. Burlington 01803 (617) 273-1320 273-1321 273-4288	Electrical; Electrical Forensic Investigation; Fire Investigation (Arson/accidental)
Demers Associates, Inc. 42 Highland St. Lunenburg 01462 (617) 582-4816	Fire protection engineering; fire investigations
Investigating Consultants on Fire and Arson Chief Norman F. Clough, Ret. 11 Echo St. Malden 02148	Investigating fires and consulting on related subjects
K-Chem Laboratories 46 Clayton St. Boston 02122 (617) 436-7181	Arson sample analysis; fire scene examination; loss analysis; fire research and reconstruction; product testing
Mechanical Designs Limited Fire Protection Systems Designers P.O. Box 700 Natick 01760 (617) 653-5452	Preparation of automatic sprinkler drawings for bid and installation purposes

State	Specialty
Timothy J. O'Leary Contract Construction Consultants Co. 97 Chapel St. Needham 02192 (617) 444-3754	HVAC, construction bond claim specialist, construction investigative services
Phoenix Technology Group, Inc. 22 Washington St. Norwell 02061 (617) 878-0567	Consultants on building code matters
Skinner and Sherman Laboratories, Inc. 300 Second Ave. Waltham 02154 (617) 890-7200	Fire investigations; failure analysis (chemical, mechanical, metallurgical, civil, electrical, electronic)
Sullivan Associates Engineering Consultants Nine Matthews St. Andover 01810 (617) 685-7555	Product liability and fire causation analysts
Technical Management Services 13 Eastgate Lane Hingham 02043 (617) 749-3010	Butane cigarette lighter safety
Michigan	
John J. Ahern, Consultant 3485 Bradway Blvd. Birmingham 48010 (313) 646-7929	Fire explosion and security
Mississippi	
A.K. Rosenhan Consulting Engineers, Ltd Drawer KJ Mississippi State 39762 (601) 325-3865	General fire protection engineering; fire investigation; computer applications of fire protection engineering
Missouri	
Code Consultants Inc. 1023 Executive Parkway Dr. St. Louis 63141 (314) 576-1850	Fire protection consulting and design

State	Specialty
Nevada	
Anti Fire, P.E. Phillips and Associates 1963 Sycamore Trail Las Vegas 89108 (702) 648-6757	Fire protection for nuclear, industrial, commercial, inspection, review, design, specification of structures, protection and suppression systems
New Jersey	
William Alvine Associates Inc. 12 Commerce Rd. Fairfield 07006 (201) 227-5340	Fire and explosion analysts; forensic science laboratory; engineering services
The FPE Group 1904 Bromley Estates Pine Hill 08021 (609) 784-7618	Fire protection engineering—industrial, government, military-defense
Safety Engineering Consultants 65 Lake Shore Rd. Lake Hopatcong 07849 (201) 663-0567	Life safety applications; flammable liquids; loss investigation; combustible dusts
A. Wallach Industrial Technical Associates 3 Stanley Rd. P.O. Box 332 West Orange 07052	Determining causes of fire; fire prevention procedures
New Mexico	
D-CO-INC. P.O. Box 5362 1210 Luisa St., Suite 11 Santa Fe 87502 (505) 983-1594	Consultants specializing in early warning fire detection and Halon 1301 fire protection systems; inspections, code compliance, design, application, reports and troubleshooting of existing system problems
New York	
American Standards Testing Bureau, Inc. 40 Water St. New York 10004 Offices and laboratories nationwide and overseas (212) 943-3160 (800) 221-5170	Complete engineering consulting and laboratory services; code and procedures development; protection systems; materials flammability and equipment evaluation; safety; risk analysis and fire loss studies

State	Specialty
Elliott R. Berrin, PE, PC P.O. Box 255 Freeport 11520 (516) 379-7706	Fire investigation and fire protection engineering
Martin M. Brown, PE, CSP 40 Midchester Ave. White Plains 10606 (914) 949-5017	Fire and explosion investigations; code interpretations
Connell Consultants, Ltd 185 Great Neck Rd. Great Neck 11021 (212) 229-4500	Fire investigation; marine fire analysis
Eugene E. Drucker Associates, Inc. 228 Lockwood Rd. Syracuse 13214 (315) 446-6864 or (315) 423-4369	Fire and arson investigation, cause and origin determination; explosions
Gage-Babcock and Associates, Inc. 105 Kisco Ave. Mt. Kisco 10549 (914) 666-2981	Consulting and engineering services in fire protection, security and safety
The Govmark Organization, Inc. P.O. Box 807 Bellmore 11710 (516) 293-8944	Flammability testing of textiles and plastics; expert witness; manufacturer of flammability test equipment
Hartheimer, Bender and Estey Architects and Engineers One Becker Terrace Delmar 12054 (518) 439-7666	Firesafety
Edwin C. Kirchmeier 72-17 Myrtle Ave. Glendale 11385 (212) 821-3786	Industrial safety; Life Safety Code; flammable liquids
North Carolina	
McNeary Insurance Consulting Services, Inc. Suite 301, 6525 Morrison Blvd. P.O. Box 220926 Charlotte 28222	Fire protection engineering—codes and standards consulting, design of systems, and inspections, investigations and reports for loss control or adjustment

State	Specialty
Research Engineers, Inc. P.O. Box 12072 Research Triangle Park 27709	Fire and arson investigations; fire protection; product liability
Ohio	
Frederick Rauh and Company 3300 Central Parkway Cincinnati 45225 (513) 559-0500	Fire sprinkler protection; property and casualty inspections; evaluations and reports; NFPA codes; FM standards and OSHA (excl health)
L.E. Shingledecker Safety Consultant 1778 S. Fountain Ave. Springfield 45506 (513) 322-6302	Development and installation of fire-safety programs with employees and/or supervisors
Oklahoma	
Joe W. Daugherty and Associates, Inc. 1720 S. Memorial Dr. Tulsa 74112 (918) 627-3646	Consulting, design and specifications for all phases of fire protection
Oregon	
John W. Anderson, PE, PhD Chemical and Engineering Consultant P.O. Box 387 Neskowin 97149 (503) 392-3622	Fire/explosion investigations; arson investigation; expert witness; flammability
Melott and Associates 11650 SW BelAire Ln. Beaverton 97005 (503) 643-5608	Fire protection consulting; fire protection engineering
Pennsylvania	
Fire Analysis Service 4018 Indian Guide Rd. Lafayette Hill 19444 (215) 828-2909	Loss risk inspections; fire prevention consultant; fire protection consultant; fire cause investigations; health-care in-service training; business and industrial training

State	Specialty
Fire Protection Engineering Associates 1710 Stoke Park Rd. Bethlehem 18017 (215) 865-3054	Consultants
Rhode Island	
Walsh Engineering Inc. Professional Fire Protection Engineers 7 Belver Ave. Quonset Point Industrial Park P.O. Box 141 North Kingston 02852 (401) 295-8600	Computer programs for sprinkler system hydraulics; computerized sprinkler system hydraulic calculations; analysis of sprinkler system capabilities; re-design of existing sprinkler systems
South Carolina	
Joseph E. Johnson Fire Protection Consultant Detection and Extinguishing Systems and General Fire Protection Engineering 1 Saltwind Way Hilton Head Island 29928 (803) 842-5185	Detection and extinguishing systems and general fire protection engineering
Tennessee	
Donald W. Belles Fire Protection Consultant 101 Cumberland Ave., Suite 200 Madison 37115 (615) 868-8877	Application of fire and building codes
Fire Protection Associates, Inc. 1101 Kermit Dr., Suite 304 Nashville 37217 (615) 361-4700	Life safety and code consulting building evaluations, and fire investigations
John A. Preston Associates 1708 Parkway Towers Nashville 37219 (615) 255-8711	Architecture; building consultants; fire protection
Professional Loss Control, Inc. P.O. Box 446 Oak Ridge 37830 (615) 482-3541	Fire protection engineering consultants—fire hazard analyses; design; training; research; inspections; audits

State	Specialty
Texas	
William E. Fitch, PE P.O. Box 63039 Wetmore 78163 (512) 654-1771	Material product safety analysis, building codes, fire testing
Rolf Jensen and Associates, Inc. 7015 W. Tidwell Rd., Suite 101 Houston 77092 (713) 462-1840 M. Crowley, PE D. Fiedler, PE K. Kimmel, PE	Fire protection engineers and building Code Consultants R. Libby, PE R. Tucker, PE C. Vollman, PE
Wormald Fire Engineering Division P.O. Box 73683 Houston 77273 (713) 537-0368	Fire protection
Vermont	
Fire Safety Institute P.O. Box 674 Middlebury 05753 (802) 462-2663	Risk analysis; information; education
Virginia	
Carson Associates Inc. Box 286-B, Rt. 3 Warrenton 22186 (703) 347-7488	Fire protection engineers
James Reid Dowling and Associates, Inc. Professional Consultants/Washington, DC [illegible]05 Bardu Court Springfield 22152 (703) 451-4307	Fire/life safety and building regulations
Gage-Babcock and Associates, Inc. 301 Maple Ave., W, Suite 2-F Vienna 22180 (703) 938-9132	Consulting and engineering services in fire protection, security and safety
Rolf Jensen and Associates, Inc. 5803 Rolling Rd., Suite 207 Springfield 22152 (703) 569-5666 J. Ferguson, PE S. Istvan, PE J. Klevan, PE	Fire protection engineers and building code consultants J. McCormick, PE J. Scheffey, PE W. Webb, PE

State	Specialty
Washington	
Cedar Falls Corporation 208 Carlson Building Bellevue 98004 (206) 454-2580	Fire and explosion investigation
McNerney, Hargett, Stephens and Associates Northgate Executive Center 155 NE 100th, Suite 104 Seattle 98125 (206) 527-3000	Fire protection consulting and fire investigation
Wisconsin	
Raymond C. Max and Associates N84 W16033 Menomonee Ave. Menomonee Falls 53051 (414) 255-4309	Fire protection systems design and loss investigations, inspections and reports
Canada	
ADI Limited P.O. Box 44 Fredericton, NB E3B 4Y2 (506) 454-4491	Fire protection for health care facilities
McCully and Associates Loss Control Consultants Inc. 1220–33 Banner Rd. Ottawa, Ont. K2H 8V7 (613) 820-9644	Fire protection
Compyro Consultants Ltd. Suite 106 1099 W. 8th Ave. Vancouver, BC V6H 1C3 (604) 732-3751	Fire protection engineers and building code consultants
M&M Protection Consultants 1 First Canadian Place P.O. Box 58, 54th Floor Toronto, Ont. M5X 1G2 (416) 868-2771	Industrial fire protection; business interruption interdependency analysis; emergency planning; audit of fire protection management
Rolf Jensen and Associates, Ltd. Suite 1308, 797 Don Mills Rd. Don Mills, Ont. M3C 1V2 (416) 429-1638	Fire protection engineers and building code consultants
D. Boehmer, PE R. Brown, PE H. Locke, PE	S. Maman, PE L. Muniak, PE J. Rubes, PE

CANADA

The following list of fire protection consultants is from the Canadian Automatic Sprinkler Association, 3638 Victoria Park Ave., Willowdale, Ontario M2H 3B2. (416) 497-2100.

Alberta

Automatic Sprinkler Limited
431 Manitou Road, S.E.
Calgary T2G 4C2
(403) 243-8210

Automatic Sprinkler Limited
11703–170 Street
Edmonton T5M 3W7
(403) 451-0280

Grinnell Fire Protection Systems
#14–4216–12 Street N.E.
Calgary T2E 6K9
(403) 276-9089

Grinnell Fire Protection Systems
14136–128 Avenue
Edmonton T5L 3H5
(403) 452-5280

Viking Sprinkler Co. Ltd.
3820–C Manchester Road S.E.
Calgary T2G 3Z9
(403) 287-2182

Viking Sprinkler Co. Ltd.
4306 81st Avenue
Edmonton T6B 2M2
(403) 465-9404

Vipond Automatic Sprinkler Co. Ltd.
Box 3320, Station D
Edmonton T5L 4J2
(403) 484-6641

Vipond Automatic Sprinkler Co. Ltd.
Building K, Unit 4
4–4429–6th Street North East
Calgary T2E 3Z6
(403) 230-1781

British Columbia

ACO Fire Protection
4837 Patrick Place
Burnaby V5J 3A5
(604) 420-3574

Argus Installation Ltd.
2625 Skeena Street
Vancouver V5M 3Y6
(604) 437-5531

Ashford Automatic Sprinkler
#103–2931 Olafson Avenue
Richmond V6X 2R4
(604) 270-1024

Automatic Sprinkler Ltd.
3210 Lake City Way
Burnaby V5A 3A4
(604) 420-3230

Canem Systems Limited
1355 Verdun Place
Richmond V6V 1W5
(604) 273-1131

Grinnell Fire Protection Systems Co. Ltd.
4027 Phillips Avenue
North Burnaby V5A 2X4
(604) 460-4636

Industrial Fire Protection
1910 Broadway
Coquitlam V3C 2N1
(604) 941-6207

Kal Sprinklers Limited
2328 Clarke Street
Port Moody V3H 1Y8
(604) 939-4416

Mawhinney Bros. Sprinklers Ltd.
1872 Kingsway
Vancouver V5N 2S7
(604) 872-7774

National Installations Ltd.
12178–86th Avenue
Surrey V3W 3H7
(604) 591-6371

Rigid Fire Protection Co. Ltd.
18628–76th Avenue
Surrey V3S 4P1
(604) 576-6865

Upper Valley Fire Protection Ltd.
219–Riverside Drive
Chilliwack V2P 3L2
(604) 792-1640

Viking Sprinkler Co. Ltd.
8290 Ross Street
Vancouver V5X 4C6
(604) 324-7122

Manitoba

Bodner Co. Ltd.
1808 Main Street
Winnipeg R2V 2A3
(204) 334-4317

Bodner Contracting Ltd.
1541 Dugald Road
Winnipeg R2J 0H3
(204) 224-3295

Grinnell Fire Protection Systems Co. Ltd.
984 Powell Avenue
Winnipeg R3H 0H6
(204) 633-9308

Reliable Fire Protection
1541 Dugald Road
Winnipeg R2S 0H3
(204) 222-1091

Vipond Automatic Sprinkler Co. Ltd.
571 Ferry Road
Winnipeg R3H 0T5
(204) 775-8411

New Brunswick

Barley Sprinkler (Sales) Limited
398 Dover Road
Fox Creek E0A 1R0
(506) 854-9224

Eastward Industries Limited
P.O. Box 282
Saint John E2L 3Y2
(506) 652-5560

Grannan Plumbing and Heating Limited
P.O. Box 625
Saint John E2L 4A5
(506) 652-4680

Viking Fire Protection Ltd.
997 Cameron Street
Moncton E1C 8L9
(506) 855-0439

Vipond Automatic Sprinkler Co. Ltd.
P.O. Box 888, 48 Rideout Street
Moncton E1C 8N8
(506) 389-3505

Newfoundland

Vipond Automatic Sprinkler Co. Ltd.
23 Sinnott Place, Kilbride
St. John's A1G 1L1
(709) 364-2898

Nova Scotia

Eastward Industries Limited
P.O. Box 2003, Dartmouth E
Dartmouth B2W 3X8
(902) 463-2776

Grinnell Fire Protection Systems Co. Ltd.
43 Fielding Avenue
Dartmouth E3R 1E3
(902) 469-8100

Scotia Sprinklers Ltd.
10 Akerly Blvd., Suite 31
Burnside Industrial Park
Dartmouth B3B 1J4
(902) 463-8953

Vipond Automatic Sprinkler Co. Ltd.
75-Y Akerly Blvd.
Dartmouth B3B 1R7
(902) 469-3465

Ontario

Adam Clark Co. Ltd.
P.O. Box 40, Station E
Hamilton L8S 4L1
(416) 823-4660

Automatic Sprinkler Ltd.
97 Bessemer Road, Suite F
London N6E 1P9
(800) 265-5449

Automatic Sprinkler Ltd.
1331 Blundell Road
Mississauga L4Y 1M6
(416) 270-1440

Babco Automatic Sprinklers and Fire Protection Ltd.
17–2nd Avenue
Ottawa K1S 2H2
(613) 233-6485

Bennett and Wright (Eastern) Ltd.
47 Cranfield Road
Toronto M4B 3H7
(416) 751-5111

Chemetron Fire Systems
39 Enterprise Road
Rexdale M9W 1C4
(416) 243-1505

Clow Darling Plumbing and Heating Ltd.
P.O. Box 578
Thunder Bay P7C 4W4
(807) 623-7485

Desco Fire Protection Ltd.
P.O. Box 107, R.R. #2, 4th Line
Navan K0A 2S0
(613) 824-7035

Duncan-Reynolds Ltd.
115 Howden Road
Scarborough M1R 3E3
(416) 751-6252

Grinnell Fire Protection Systems Co. Ltd.
25 Groff Place, Unit 1
Kitchener N2E 2L6
(519) 893-5100

Grinnell Fire Protection Systems Co. Ltd.
2427 Holly Lane
Ottawa K1V 7P2
(613) 731-0761

Grinnell Fire Protection Systems Co. Ltd.
25 Worcester Drive
Rexdale M9W 1K9
(416) 675-6340

Grinnell Fire Protection Systems Co. Ltd.
3291 Marentette Avenue
Windsor N8X 4G4
(519) 966-1910

H.G. Francis and Sons Ltd.
508 Gladstone Avenue
Ottawa K1R 5N9
(613) 238-4700

Metro Sprinkler and Fire Systems Ltd.
247 Carrier Dr., Unit 3
Rexdale M9W 5Y9
(416) 741-6964

Niagara Mechanical Contractors
12 Penn Drive, Unit 2
Weston M9L 2A9
(416) 749-6031

Nicholls Radtke and Associates Ltd.
145 Hemstead, Box 4494, Station D
Hamilton L8V 4S7
(416) 387-3705

St. Clair Sprinkler Systems Inc.
1300 Plank Road
Sarnia N7T 7H5
(519) 336-7473

The Rowan Sprinkler Co. Ltd.
22 Lock Street
St. Catharines L2N 5B5
(416) 935-5253

Troy Sprinkler Limited
2A Christie Drive, Box 428
Beamsville L0R 1B0
(416) 563-4889

Viking Fire Protection Ltd.
R.R. #3
Gananoque K7G 2V5
(613) 382-2842

Viking Fire Protection Ltd.
80 Colonnade Road
Ottawa K2E 7L2
(613) 225-9540

Viking Fire Protection Ltd.
106 Advance Road
Toronto M8Z 2T7
(416) 233-1246

Vipond Automatic Sprinkler Co. Ltd.
1212 Victoria Street North
Kitchener N2B 3E2
(519) 743-5246

Vipond Automatic Sprinkler Co. Ltd.
30 Midpark Crescent
London N6N 1B1
(519) 681-2233

Vipond Automatic Sprinkler Co. Ltd.
6380 Vipond Drive
Mississauga L5T 1A1
(416) 678-7060

Vipond Automatic Sprinkler Co. Ltd.
34 Bentley Avenue
Ottawa K2E 6T8
(613) 225-0538

Vipond Automatic Sprinkler Co. Ltd.
685 Harold Crescent
Thunder Bay P7C 5H6
(519) 623-1214

York Fire Protection
159 Denison Street
Markham L3R 1B5
(416) 495-6680

Quebec

Extincteurs Automatiques Vipond Ltée.
295, avenue Labrosse,
Pointe Claire H9R 1A3
(514) 695-1032

La compagnie de Systèmes de protection incendie Grinnell Ltée,
1070 rue Beaulac,
St-Laurent H4R 1R7
(514) 336-7040

Les Gicleurs automatiques Ltée,
601, rue Stinson,
St-Laurent H4N 2E1
(514) 747-1154

Protection incendie Viking Ltée,
C.P. 100 (Cartierville),
Montréal H4K 2J4
(514) 332-5110

Saskatchewan

Viking Sprinkler Co. Ltd.
218–48th St. East #5
Saskatoon S7K 6A4
(306) 653-3640

Vipond Automatic Sprinkler Co. Ltd.
825C Cynthia Street West
Saskatoon S7L 6B7
(306) 665-7858

Vipond Automatic Sprinkler Co. Ltd.
227–7th Avenue
Regina S4N 5H5
(306) 359-1033

Grinnell Fire Protection Systems Co. Ltd.
617 Henderson Drive
Regina S4P 3B4
(306) 949-6060

Western Automatic Sprinklers Inc.
2327 Lorne Street
Regina S4P 2N1
(306) 352-0080

Arbitrators/Negotiators

National Public Employer Labor Relations Association (NPELRA)

The NPELRA, established in 1970, is the national professional organization for public sector individuals who have the responsibility for representing public management in the employee relations arena.

The membership of the NPELRA is composed of the leading management advocates in the country, including experts in all areas of public sector employee relations.

The following is the affiliate membership of the NPELRA, which is composed of attorneys and consultants who are not employees of a public employer but who represent and actively work for the interests of public management and who solely represent and support the interests of management in employee relations matters.

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Los Angeles 90017
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Minneapolis 53402
(612) 333-4800

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Labor Rel. Associations, Inc.
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Golden Valley 55427
(612) 546-1470

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Steffen, Munstenteiger, Bearse, Beens, Parta and Peterson

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Anoka 55303
(612) 427-6300

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801 Washington St.
Northfield 55057
(507) 645-8833

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Dorf and Glickman, P.A.
2376 St. Georges Ave.
Rahway, NJ 07065

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Bee and DeAngelis
170 Old Country Rd.
Mineola 11501
(516) 746-5599

Stephen J. Vollmer
Bond, Schoeneck and King
One Lincoln Center
Syracuse 13202
(315) 422-0121

Ohio

Dean E. Delinger
Smith and Schnecke
29th Floor DuBois Tower
511 Walnut St.
Cincinnati 45202
(513) 226-6527

Oklahoma

Jim L. Lindsey
Hood and Lindsey
1606 First National Bank Building
Tulsa 74103
(918) 583-5825

Oregon

Les Smith
Bullard, Korshoj, Smith and Jernstedt
1291 SW 12th Ave.
Portland 97205
(503) 248-1134

South Carolina

Charles Caulkins
Thompson, Mann and Hutson
The Daniel Building
Greenville 29602
(803) 242-3200

Vermont

Bennett Evans Greene
RD #2
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(802) 863-4453

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Public Service Research
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Director of Personnel
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Seattle 98121
(206) 464-1490

Wisconsin

Ronald J. Rutlin, Esq.
Mulcahy and Wherry, S.C.
408 3rd St.
Wausau 54401
(715) 842-0502

In colonial days, fire stations were made of wood and resembled garden toolsheds. The town's fire engines, hooks, and ladders were stored in these early stations.

Federal Emergency Management Agency

Organization

The Director of FEMA reports to the President and works closely in emergency management matters with the National Security Council, the Cabinet, and the White House staff.

Personnel

FEMA has a staffing level of approximately 2,500.

National Headquarters

FEMA Headquarters is located at 500 C Street, SW, Washington, D.C. 20472.

Regional Offices

There are 10 FEMA Regional Offices. Each office is headed by a Regional Director who reports to the FEMA Director and is responsible for all FEMA programs in the region. FEMA Regional Offices are:

Region I (Boston)
442 J. W. McCormick, POCH
Boston, MA 02109
(617) 223-4741

Region II (New York)
26 Federal Plaza
New York, NY 10278
(212) 264-8980

Region III (Philadelphia)
Curtis Bldg., 7th Floor
6th & Walnut Sts.
Philadelphia, PA 19106
(215) 597-9416

Region IV (Atlanta)
Gulf Oil Bldg., Suite 664
1375 Peachtree St., NE
Atlanta, GA 30309
(404) 881-2400

Region V (Chicago)
300 S. Wacker Dr. (24th Floor)
Chicago, IL 60606
(312) 353-1500

Region VI (Dallas)
Federal Regional Center, Rm. 206
Denton, TX 76201
(817) 387-5811

Region VII (Kansas City)
Old Federal Office Bldg., Rm. 300
Kansas City, MO 64106
(816) 374-5912

Region VIII (Denver)
Federal Regional Center, Bldg. 710
Denver, CO 80225
(303) 234-6542

Region IX (San Francisco)
211 Main St., Rm. 220
San Francisco, CA 94105
(415) 556-8794

Region X (Seattle)
Federal Regional Center
Bothell, WA 98011
(206) 481-8800

In Massachusetts, in 1675-76, during the series of incidents known as King Philip's War, some 1,200 dwellings were burned and over 600 persons were killed in the savage encounters between the colonists and the Indians.

(David Lovejoy, *The Glorious Revolution in America*)

National Fire Academy

The National Fire Academy (NFA) was established under the National Fire Prevention and Control Act of 1974 (Public Law 93-498) to advance the professional development of the fire service and other professions engaged in fire prevention and control.

Since 1977, the Academy has been offering programs in fire science technology, management and planning, and educational methods. Courses have been delivered to nearly 5,000 fire service officers, fire fighters, instructors, planners, professionals in related trades, and federal and state fire officials in more than 100 locations around the country.

National Fire Academy courses are designed to "train the trainer," that is, to provide training to individuals who will then train other personnel, creating a multiplier effect. In this way, the impact of the Academy can be greatly increased by offering NFA courses to a much larger audience than could be accommodated at the Academy.

A milestone in the effort to upgrade the level of advanced training available to the fire service was the formal opening of the Academy's resident campus on January 21, 1980. The Academy is the national focal point for fire prevention and control training, providing fire service professionals, both volunteer and career, access to significant advances in technological and management areas. The Academy also offers training to individuals in allied professions — code enforcers, architects, city managers and administrators, and planners.

Through systematic research, analysis of student critiques, and consultation with fire service organizations and leaders, the Academy continually revises, improves, and expands its curricula to meet national priorities. In FY 1983, 21 resident courses will be offered, the most comprehensive fire training curricula to date.

The NFA is one of two divisions of the National Emergency Training Center (NETC) and now shares its campus at Emmitsburg, Maryland with the Emergency Management Institute (EMI), the second division of the NETC. The EMI offers a wide range of courses helping regional leaders respond to and mitigate varying emergencies from natural disasters to potential nuclear attack.

The Campus and Facilities

The 107-acre campus is shared by the National Fire Academy and the Emergency Management Institute. Fully equipped, air-conditioned classrooms accommodate up to 1,000 students at one time. Four dormitories can house 325 students in single occupancy rooms, and dining facilities are located on campus.

Educational buildings contain modern equipment for laboratory exercises as well as classrooms, "break-out" rooms, and a 240-seat lecture hall. An arson fire scene laboratory, a fire protection systems laboratory, and a fire tactics simulator were established recently. A laboratory containing a variety of microcomputers provides students with practical "hands-on" experience in a new course, Use of Microcomputers for Fire Service Management, and other Academy courses such as Arson Investigation.

The library offers a full range of services to support student assignments. Print and non-print materials are available on fire-related topics. Materials may be borrowed and used by all staff and students during the library's day, evening, and weekend hours.

The Emmitsburg facility also contains a modern student center with pub, a waterside log cabin, tennis courts, gymnasium, and indoor pool for on-campus recreation.

The campus is located a few miles south of the Pennsylvania border, 70 miles northwest of Baltimore, and 75 miles north of Washington, D.C. Points of interest nearby include national and state parks, historic Gettysburg, and outdoor recreational areas featuring golf, swimming, and skiing.

Food, Lodging, and Travel Arrangements

The National Emergency Training Center will refund the cost of transportation to and from the campus for other than private industry and federal employees. These sponsoring organizations must pay the cost of transportation for their employees. In addition, federal and private employees are required to pay a fee of $5 a day for lodging when attending the National Fire Academy. With these exceptions, students pay only $11 a day for meals. (This amount may change depending on the negotiated food services contract.) Students are billed for meals, based on the length of stay, at the time they are notified of admission acceptance. All instructional materials and basic student supplies are provided by NETC.

Reimbursement for travel costs to the student, including travel by common carrier or by privately owned vehicle, are initiated when the student registers at NETC. Negotiations currently are underway with the Scheduled Airlines Travel Office (SATO) to provide a ticketing service for NETC students. SATO is a service provided by the U.S. scheduled airlines.

Policy dictates that the option to travel by privately owned vehicle (which is encouraged) is available when the one-way distance between the student's residence and the campus does not exceed 600 miles. Those who drive are asked to economize by carpooling with other applicants from the same area.

Students must travel by the most economical method as determined by NETC. The closest major transportation centers to Emmitsburg are Washington, D.C. and Baltimore, Maryland, both of which are approximately 1½ hours away by car. For those students living beyond a reasonable driving range, ground transportation is provided to and from Dulles International, Baltimore-Washington International, and Washington National Airports and the campus on a schedule provided with the notification of acceptance.

Board of Visitors

Eight individuals serve as members of a Board of Visitors for the National Fire Academy. Members are outstanding professionals in the fields of firesafety, prevention, and control; research and development in fire protection; and in related areas such as government service, training and education, and the private sector.

The function of the Board is to review annually the Academy's program and to make comments and recommendations to the Director on the operation of the Academy.

Chief Andrew C. Casper (Chairman)
Representing the International Association
of Fire Fighters

Louis J. Amabili
Representing the International Society
of Fire Service Instructors

Dr. William J. Christian
Representing Underwriters Laboratories,
Inc.

Jerrold S. Pressman
Representing the American Institute
of Architects

Joseph M. Redden
Representing the National Fire
Protection Association

Chief Larry Bonnafon
Representing the International
Association of Fire Chiefs

Henry J. Roux
Representing the Chamber of
Commerce

Dr. J. Bryan Collester
Representing the educational
community

For additional information on the National Fire Academy, contact:

Your state fire training agency

or

Office of Admissions and Registration
National Emergency Training Center
16825 S. Seton Ave.
Emmitsburg, MD 21727
(301) 447-6771
or
(800) 638-9600, ext. 9601

Fire Academy Curricula

The NFA resident courses are divided into four broad categories:

The Fire Service Technical Series

Addressing the need to develop effective emergency incident commanders capable of making strategic decisions to save lives and property at the emergency scene.

The Fire Service Management Series

Seeking to increase the management skills of senior fire service officers and mid-level officers destined to become fire service leaders in the future.

The Fire Prevention Series

Presenting courses for those who evaluate and manage fire risk in their communities, whether through fire prevention and inspection or arson detection and investigation.

The Special Program Series

Providing specific courses for the experienced fire inspector and mid-level fire manager seeking professional development and advancement, and for the Fellowship student interested in an intensified approach to training.

Accreditation

Courses presented at the National Fire Academy are equivalent to those given at the college/university level. Academy students may be eligible for college credits when completing certain courses in the resident program. Although the Academy itself is not an accredited institution, college credits can be transferred to a degree program already under way.

Courses presently available in each of the Academy series are as follows:

The Fire Service Technical Series

NOTE: See "Calendar of Events for 1983" in the Reference Section for specific dates when these courses will be offered in 1983.

Incident Command

Incident Command is a two-week course. It is designed to give the student an awareness of problems presented by various fire and emergency situations (primarily in the structural environment). It offers a systematic process of resource management involving the first alarm assignment, with emphasis placed on strategy, tactics, pre-fire planning, and personnel safety. Methodologies utilized include case studies and simulation.

Incident Command/Fire Arson Detection

Incident Command/Fire Arson Detection, is a three-week sequence linking two courses of interest to the Incident Commander. Applicants are required to take the entire three-week sequence.

- *Incident Command* (as described above), and
- *Fire/Arson Detection* is designed to identify effective methods of arson detection. It is intended for fire officers and senior fire fighters. The course covers determining the point of origin of a fire, discriminating between accidental and incendiary fire causes, handling operations at the fire scene, collecting and preserving evidence, and recording information to support later arson investigation. This course is not designed to fill the more advanced needs of the fire investigator.

Advanced Incident Command

Advanced Incident Command is a two-week course designed for fireground managers whose duties include planning for and commanding large-scale, complex, and lengthy operations. The course covers a system of incident command particularly adaptable to providing orderly management at large operations. It delineates both line and staff functions and responsibilities. Analyses of various fire situations are studied as an aid to more effective decision making. Case studies of unusual and significant incidents are an integral part of the course.

The use of a fireground simulator provides a valuable training experience. A concluding field exercise and critique merge the various lessons learned into a quasi-realistic event.

Chemistry of Hazardous Materials

Chemistry of Hazardous Materials is a two-week course that provides the basic knowledge required to evaluate the potential hazards and behaviors of materials considered to be hazardous for one or a combination of reasons. Directed at the underlying reasons for the chemical behavior of hazardous materials, the course is designed to improve decision making, safety operations, and handling. The course is heavily chemistry-oriented.

Hazardous Materials Tactical Considerations

Hazardous Materials Tactical Considerations is a two-week course which identifies the safe procedures and tactics for alleviating the danger from a hazardous materials incident. Subjects covered include hazardous materials response team organization and equipment, hazard recognition, analytical instruments, classes of hazardous materials, protective clothing, and breathing apparatus. Case studies from fixed facility and transportation system accidents are analyzed, and hazardous materials problems are solved. The student has an opportunity to use equipment such as acid suits and various types of SCBA.

Planning for a Hazardous Materials Incident

Planning for a Hazardous Materials Incident demonstrates that to successfully manage a large-scale hazardous materials incident it is necessary to have a comprehensive plan encompassing all involved agencies. This two-week course presents formats, methods, and techniques used in planning, and attempts to develop the student's ability to prepare such a plan. Subject areas include determining the community's potential for disaster, resolving organizational conflicts, understanding legal issues, managing evacuation, and operating command posts and emergency operation centers. Incident management is also addressed through simulations.

Educational Methodology

Educational Methodology is a two-week, two-phase instructor development course designed to prepare fire and rescue personnel as instructors.

The first phase provides specific information about audience needs, performance objectives, teaching strategies, instructional aids and media, lesson planning, and testing. Students engage in applied performance activities to demonstrate their understanding of each concept.

The second phase requires the student to design instructional approaches, create instructional materials, and actively demonstrate three prescribed training deliveries for peer and instructor evaluation. This provides students with opportunities to refine the techniques they will apply as trainers.

Course Development

Course Development is a two-week course designed to teach training personnel how to design and develop courses and implement education and training programs. The program identifies the components of a typical course development process and teaches trainers how to plan, research, write, and evaluate a training program. Media production techniques also are discussed. Students partially develop a course of instruction.

The Fire Service Management Series

Executive Development III

An intensive two-week program for top-level fire officers which provides an opportunity to expand their managerial approaches and improve organizational effectiveness. The focus of the program is on future challenges which will have an impact on the changing role of fire executives; the goal is to encourage proactive management in fire service organizations.

Major subject areas include: group process and team development; future trends in American communities; emerging roles of fire executives; policy and planning; organizational development and effectiveness; managing change; research and innovations; personnel management; legal rights and responsibilities; and managing public opinion.

Management of Emergency Medical Services for the Fire Service

A two-week course designed for fire service managers who are beginning an EMS service or are considering upgrading an existing service. The course is designed to provide systematic approaches for the management of FS/EMS. Specific topics include: resources and constraints to system development, impact of EMS on capital and operating costs of the fire department, mechanisms for medical control and quality assurance, sources of financial support, and evaluation of FS/EMS delivery systems using low-cost microcomputers.

The course is designed with a variety of instructional methods and activities, all aimed at assisting students in solving problems related to their FS/EMS needs. The course provides a high degree of student involvement in both individual and group activities. One of the most unique learning opportunities in the course is students' development of a simulated FS/EMS system called "Metropolis."

Fire Service Leadership/Communications

A three-week course designed to enhance a mid-level manager's skills in leadership, supervision, and communication.

- *Week 1, Leadership Training,* provides an in-depth analysis of Fiedler's Leader-Match model with specific applications to fire service problems and situations. The

Leader-Match concept then provides a theoretical context for personal skill-building in goal setting, motivation, and personal counseling.

- *Week 2, Written Communication*, provides the requisite knowledge and skills for effective written communication. Writing workshops are designed to study common writing problems, drawing on real fire department materials as illustrations. Group and individual evaluation by selected assignment papers submitted by participants is an important feature.
- *Week 3, Oral Communication*, provides practical and theoretical concepts of effective oral communication. Oral presentations by participants are videotaped and evaluated by the individual, other participants, and the instructor.

Fire Service Organizational Theory

A two-week overview of broad management theory and its practical application to fire service organizations. Participants trace the evolution of management theory and examine the implications for fire service managers. Analytical tools and skills are applied in workshop exercises, case studies, and force-field analysis. Specific modules include: Public Service Management; Five Functions of Management; Organizational Effectiveness; Management Information Systems; Program Analysis; Public Finance; and Public Opinion.

Interpersonal Dynamics in Fire Service Organizations

A two-week course designed to prepare fire service managers to understand the dynamics of human behavior within an organizational environment. Participants begin with a critical self-assessment of their individual managerial strengths and weaknesses which results in a specific plan for their own professional development. Techniques for creating effective organizational environments are defined. Components of a successful human resource development plan are examined.

Course modules include: Managerial Style; Stress Management; Conflict Resolution; Time Management; Counselling; Communication; Group Dynamics; and Human Resource Development.

Management of Public Fire Education

A two-week course designed for individuals in charge of an organization's public education function. The course will help students make their public education programs more efficient and effective. The two main subject areas are management skills and educational technology skills. Content includes: Educational Technology; Functions of Management; Research Methodology; Budgeting; Financing; Interpersonal and Group Relations.

Use of Microcomputers for Fire Service Management

A comprehensive two-week program designed to support the utilization of low-cost computers as a fire management resource. Program topics include: organizational analysis; analysis of information requirements; organizational issues associated with fire service data processing; purchasing microcomputer systems; use of hardware; and formatting commercial software for fire service use. Students have an opportunity for extensive "hands-on" experience in the Academy's computer laboratory.

The Fire Prevention Series

Fire Prevention Specialist I

A two-week program designed to improve the professional development of fire inspectors. The course provides a solid, technical background for conducting official fire inspections. Areas of study include law, code enforcement, prevention analysis, inspection competencies, life safety, hazardous materials, electrical and heating systems, and "hands-on" experience in the Academy's fully operational Fire Protection Systems Laboratory.

Fire Prevention Specialist I/Fire Arson Detection

A three-week sequence linking two courses of interest to the Fire Prevention Specialist. Applicants are required to take the entire three-week sequence.

- *Fire Prevention Specialist I* (same as above), and
- *Fire/Arson Detection* designed to identify effective methods of arson detection. The course covers determining the point of origin of a fire, discriminating between accidental and incendiary fire causes, handling operations at the fire scene, collecting and preserving evidence, and recording information to support later arson investigation. This course is not designed to fill the more advanced needs of the fire investigator.

Fire Prevention Specialist II

A two-week course designed to meet the professional development needs of the advanced fire prevention officer. This course addresses plans review, recordkeeping, interpersonal communications, code interpretation, fire protection systems, special assignments, and firesafety evacuation planning.

The course combines classroom instruction and a "hands-on" learning approach in the fully operational Fire Protection Systems Laboratory. The course stresses conceptual learning dealing with problem solving, mechanical competence, and behavioral approaches.

Fire Arson Investigation

A three-week course designed for personnel whose primary responsibility is the investigation of fire-related incidents. This in-depth course defines successful methods for conducting legal fire investigations which culminate in prosecution for arson. Specific topics include: point of origin and fire causes, both accidental and incendiary; motivation of the firesetter; fire scene investigation; and legal aspects of fire investigation. Classroom instruction is enhanced by actual burn scene examination and case development in the Academy's Arson Fire Scene Laboratory.

Managing the Code Process

A two-week course designed for personnel responsible for the code process in their community, including adoption, change, revision, administration, application, and enforcement.

Topics covered include: proper code selection; acceptable level of risk analysis; proper use of change mechanisms; how the application of codes impacts on a community; how to assess and interact with political power bases.

Plans Review for Inspectors

A two-week course designed to provide the participant with a systematic approach to verify that a complete set of construction documents complies with applicable codes. Participants also learn how to verify that sprinkler, standpipe, fire alarm and detection systems, and fire pump installation are designed in compliance with applicable standards. The course covers the development of a plan review system and special tasks which the plan reviewer may be expected to perform.

Special Program Series

The Fellowship Program

The National Fire Academy Fellowship Program is designed to provide a coordinated, highly intensified approach to training. The Fellowship student is a member of a unique group involved in an extended learning experience at the Academy.

Students are provided the opportunity to attend a series of Academy courses scheduled in sequence during a selected time period. They may choose an across-the-board sampling of courses or concentrate on those offered in their area of expertise. However, the acceptance criteria must be met for any course selected.

To successfully complete the Fellowship Program, students must attend Academy courses for at least eight weeks.

Senior Fire Prevention Officer Program

This six-week program provides the experienced fire inspector with information and skill development for senior inspector responsibility. First it covers general technical fire inspections, then moves to the more advanced needs in specialized inspection and testing of detection and protection systems. Finally, it addresses the development, application, and enforcement of codes. The program includes Fire Prevention Specialist II, Managing the Code Process, and Plans Review For Inspectors.

Executive Development II Program

This program is designed to enhance the professional development of mid-level fire managers. Three courses are offered sequentially in a seven-week span, offering participants a comprehensive theoretical base for effective management.

- *Fire Service Organizational Theory* defines management theory and focuses on the knowledge and skills required for managers to effectively respond to the organization's needs.
- *Interpersonal Dynamics in Fire Service Organizations* defines human behavior and focuses on the knowledge and skills required for managers to effectively respond to the needs of individuals.
- *Fire Service Leadership/Communication* stresses specific supervisory skills and provides participants with an in-depth assessment of their individual leadership skills, including written and oral communication.

Field Programs

National Fire Academy field programs are intended to supplement and complement state and local fire training efforts. The majority of these field courses are designed to be ultimately handed off to state and local fire training systems. Through "train the trainer" instructor workshops (a system of demonstration course deliveries) and hand-off to state and local fire training agencies, National Fire Academy courses are made available to those individuals unable to attend resident courses.

Academy field courses are usually between 12 and 14 hours long and are normally conducted on weekends. They are short-term, intensive training experiences, designed to provide a maximum opportunity for active student participation. Field courses are cooperatively selected and co-sponsored by the National Fire Academy and state fire training agencies. This national/state linkage supplements existing state and local fire training efforts.

In FY 1983, more than 220 field courses will be conducted at 140 locations throughout the United States. Courses offered include: Fire/Arson Detection; Fire Incident Management; Fire Prevention I; Hazardous Materials Incident Analysis; Volunteer Fire Service Management; Emergency Medical Services Administration; Fire Apparatus Purchase and Maintenance; Building Construction for Fire Suppression Forces; Instructional Techniques for Company Officers; Public Fire Education Planning; and Pesticide Fire and Spill Control.

Weekend Courses on Campus

National Fire Academy field courses are offered on selected weekends at the National

Emergency Training Center campus in Emmitsburg, Maryland. These weekend courses provide additional opportunities to visit the Academy and participate in Academy courses.

Weekend courses to be offered during 1983 are (see also "Calendar of Events for 1983" in the Reference Section):

Hazardous Materials Incident Analysis, April 23-24
Fire Incident Management, May 21-22
Building Construction for Fire Suppression Forces, May 28-29
Instructional Techniques for Company Officers, July 23-24
Fire/Arson Detection, August 6-7
Hazardous Materials Incident Analysis, August 20-21
Building Construction for Fire Suppression Forces, September 24-25

Students in these weekend courses receive lodging, tuition, and course materials at no cost. There is a nominal charge for meals provided in the campus dining hall.

State Authorities with Fire Interests

State Fire Marshals

Forty-eight states have offices at the state level to oversee certain phases of fire protection (see Table). The chief fire protection administrator at the state level is usually called the state fire marshal. The organization and size of state fire marshal offices differs from state to state. Most fire marshals receive their authority from the state legislature and are answerable to the governor, a high state officer, or a fire commission. In some states, the fire marshal's office may be a division of the state insurance department, state police, state building department, state commerce division, or other state agency. A few are organized as separate agencies.

State fire marshals' offices normally function in those areas that go beyond the scope of municipal, county, or fire district organizations. Depending on the authority outlined in enabling legislation or the administrative regulations, state fire marshal offices may have combinations of responsibilities in the following areas: code enforcement; fire prevention inspections; plans review; fire and arson investigation; fire data collection; fire data analysis; fire service training; public fire education; fire legislation development; explosives and other hazardous materials regulation; manufactured housing regulations; mobile home regulations; electrical inspections, and state agency and public fire protection consulting.

State fire marshals may share responsibility with local fire officials, or each may have specifically defined areas of concern. Local fire protection officials are sometimes granted the authority to act as agents for the state in stipulated areas of inspection, enforcement, and investigation.

Summary of State-Level Fire Authorities

A brief description of the enforcement agencies in each of the fifty states and the District of Columbia having jurisdiction in fire-related matters, and a brief summary of the general nature of the laws and regulations in effect in 1982 are as follows:

(NOTE: Due to pending legislation and other difficulties, information about the following states has not been updated by NFPA since 1976: Delaware, Indiana, Louisiana, New Hampshire, Oregon, Pennsylvania, and Tennessee.)

Alabama: The Office of the State Fire Marshal is a division of the Department of

Functions of the State Fire Marshal's Office

STATE	Code Enforcement	Fire & Arson Investigation	Plans Review	Fire Prevention Inspections	Fire Data Collection	Fire Data Analysis	Fire Service Training	Public Fire Education	Fire Legislation Development	Manufactured Housing Regulations	Mobile Home Regulations	Electrical Inspections	Boiler Inspections	Distribution of Funds to Fire Dept.
Alabama	X	X	X	X	X	X	X	X			X	X		
Alaska	X	X	X	X	X	X	X	X						
Arizona	X	X	X	X	X	X	X	X	X					
Arkansas	X	X	X	X	X	X	X	X	X					
California	X	X	X	X	X	X	X	X	X					
Colorado[1]				NONE										
Connecticut	X	X	X	X	X	X	X	X	X					
Delaware	X	X	X	X	X	X			X					
Florida	X	X		X	X	X	X	X	X					
Georgia	X	X	X	X				X			X	X		
Hawaii[2]				NONE										
Idaho	X	X		X	X	X			X	X	X	X		
Illinois	X	X	X	X	X	X			X					
Indiana	X	X	X	X	X	X	X	X	X	X	X	X		
Iowa	X	X	X	X	X	X		X	X					
Kansas	X	X	X	X	X				X					
Kentucky	X	X	X	X	X	X	X	X	X	X	X	X		
Louisiana	X	X	X	X	X	X	X	X	X	X	X	X		
Maine	X	X	X	X	X		X	X	X					
Maryland	X	X	X	X	X	X		X	X			X		
Massachusetts		X			X									
Michigan	X	X	X	X	X	X	X		X					
Minnesota	X	X	X	X	X				X		X			
Mississippi		X									X			
Missouri	X	X	X		X	X			X					
Montana	X	X	X	X	X	X		X	X					
Nebraska	X	X	X	X	X	X		X	X	X	X	X		
Nevada	X	X		X					X					
New Hampshire	X	X	X	X	X	X		X	X	X		X		
New Jersey[3]				X	X									
New Mexico	X-	X		X	X	X	X	X	X					X
New York[4]				X	X	X	X	X	X					
North Carolina	X		X				X	X	X	X	X	X		
North Dakota	X	X	X	X	X	X			X					
Ohio	X	X	X	X	X	X	X	X	X					
Oklahoma		X	X	X	X			X	X					
Oregon	X	X	X	X	X	X	X	X	X					
Pennsylvania	X	X	X		X									
Rhode Island	X	X	X	X	X									
South Carolina	X	X	X	X				X	X	X	X			
South Dakota	X	X	X	X	X	X		X	X					
Tennessee	X	X	X	X	X	X		X	X		X	X		
Texas	X	X		X				X						
Utah	X	X	X	X	X	X	X		X					
Vermont		X			X									
Virginia	X	X	X							X	X			
Washington	X	X	X		X			X						
West Virginia	X	X	X	X	X	X	X	X	X					
Wisconsin		X										X		
Wyoming	X	X	X	X	X	X	X	X				X		
District of Col.	X	X	X	X	X	X	X	X	X					

Footnotes:

1. Colorado — No state fire marshal's office.
2. Hawaii — State fire marshal's office disbanded April, 1979 — all functions transferred to county fire marshals' offices.
3. New Jersey — State fire marshal has authority over state owned buildings only; voluntary collection of fire loss statistics.
4. New York — State Fire Administrator.

Insurance. The fire marshal, his assistant, and his deputies are state law enforcement officers with full general powers of peace officers, as well as subpoena power. The division enforces state laws regarding fires, explosions, arson, and fireworks, and conducts investigations concerning these laws. The division has adopted the Standard Building Code, Standard Fire Prevention Code, and the Codes and Standards of NFPA. The Fire Marshal's Office conducts inspections of hotels, motels, day-care centers, jails, prisons, and various other occupancies covered by the adopted codes. A barrier-free design code and mobile home blocking and anchoring code have been written and adopted by the fire marshal. The mobile home section of the office conducts inspections of mobile homes, acting as a State Administrative Agency for HUD. The fire marshal serves as a member of the State LP-Gas Board and the Fire Fighters Personnel Standards and Education Commission.

Roy L. Thornell
State Fire Marshal
Alabama Dept. of Insurance
445 South McDonough St.
Montgomery, AL 36130
(205) 832-5844

Alaska: The Office of State Fire Marshal is organized in the Division of Fire Prevention of the Department of Public Safety. The fire marshal enforces the arson law, the Alaska Fire Safety Code governing conditions hazardous to life and property from fire and explosion, and the Uniform Building Code; but local codes are adopted and enforced locally. The National Electrical Code is administered by the Department of Labor. Mobile home regulations are adopted and enforced by the Department of Commerce.

Ronald A. Hendrie
Director, State Fire Marshal
Division of Fire Prevention
Alaska Dept. of Public Safety
P.O. Box 6188 Annex
Anchorage, AK 99502
(907) 465-4331

Arizona: The state fire marshal operates under the Industrial Commission. The fire marshal adopts and enforces minimum fire prevention and firesafety rules and regulations and has adopted the Uniform Fire Code and NFPA *101, Life Safety Code* as it pertains to schools, health care facilities, and institutions. The fire marshal also conducts fire investigations and assists cities and counties in regulation enforcement, maintains a statewide reporting system, and provides fire prevention and fire fighting training to fire departments statewide.

B. Paul Saunders
State Fire Marshal
Industrial Commission of Arizona
P.O. Box 19070
Phoenix, AZ 85005
(602) 255-5062

WE WANT TO KNOW . . .

if a name, an address, or a phone number has changed; if there's an upcoming event, a new program or course, a new publication being offered. If you have more current information than is contained in this *Almanac*, know something that should be included in this book, or just have something interesting about the fire protection scene that you want to contribute, please let us know. Write: Editor, *Fire Almanac*, NFPA, Batterymarch Park, Quincy, MA 02269. All suggestions will receive our careful attention.

Arkansas: The Director of State Police is the state fire marshal. The Fire Marshal Law covers: arson, exits, fire escapes, fire equipment, fireworks, combustibles, and explosives. LP-Gas is regulated by the LP-Gas Board. There is a State Fire Prevention Code which is substantially the Fire Prevention Code promulgated by the American Insurance Association.

Lieutenant Ray Carnahan
Arkansas Dept. of State Police
Fire Marshal Section
#3 Natural Resources Dr.
P.O. Box 5901
Little Rock, AR 72215
(501) 224-3103

California: The Office of the State Fire Marshal is a governmental department administered by the state fire marshal who is appointed by the governor. Title 19 of the California Administrative Code contains regulations and standards relative to buildings and public places, fabrics and tents, fire extinguishers and alarms, fireworks, explosives and flammable liquids. The fire marshal maintains a fire research laboratory, has an arson and bomb investigation unit, collects fire data from all fire departments in the state, and manages the California Fire Academy and a fire service training program.

Philip C. Favro
State Fire Marshal
State of California
7171 Bowling Dr., Suite 600
Sacramento, CA 95823
(916) 427-4161

Colorado: There is no state fire marshal. The fire chiefs of the municipalities and fire protection districts are responsible for enforcement of state and local fire protection laws. The Industrial Commission of Colorado is empowered by statute to enforce certain recognized fire and safety codes and standards. The commission reviews and approves all new school construction plans. The State Inspector of Oils enforces all standards covering the use of all liquid flammable fuel products and systems including LP-Gas Regulations.

Connecticut: The Commissioner of Public Safety is ex-officio the state fire marshal. The Bureau of State Fire Marshal is commanded by a deputy state fire marshal, designated as such by the commissioner. The law contains provisions for a firesafety code covering all occupancies other than one- and two-family dwellings and places used for manufacturing purposes. The code covers schools, hospitals, convalescent homes, homes for the aged, places of public assembly, hotels, rooming houses, and child day-care centers. Other regulations of the state fire marshal cover circuses and carnivals; storage and transportation of flammable liquids and liquefied petroleum gas; storage and transportation of hazardous chemicals; the operation of motion picture theaters; and other fire hazards. There is a Fireworks Law and an Arson Law. The State Labor Department is responsible for firesafety in factories. A State Building Code is administered by the Commissioner of Public Safety also, which regulates all construction in the state.

Captain Leslie W. Williams, Jr.
Deputy State Fire Marshal
Bureau of State Fire Marshal
Division of State Police
Connecticut Dept. of Public Safety
294 Colony St.
Meriden, CT 06450
(203) 238-6620

Delaware: There is a state fire marshal. He enforces laws covering arson, fireworks, explosives, fire escapes and fire prevention standards. There is also a State Fire Prevention Commission which has adopted fire regulations under the Delaware Code, Fire Protection Rules and Regulations.

J. Benjamin Roy, Jr.
State Fire Marshal
State of Delaware
R.D. #2, Box 166A
Dover, DE 19901
(302) 736-4393

District of Columbia: The chief of the fire department is responsible for supervising the enforcement of the D.C. Fire Prevention Code. This responsibility is delegated to the deputy fire chief, Fire Prevention Division. The division is responsible for the investigation of fires and the inspection of all buildings, except private dwellings and public buildings or premises owned or under the exclusive control of the United States, relative to LP-Gas installations, hazardous operations, storage, and other common fire hazards. Natural gas, LP-Gas piping, electrical regulations and the D.C. Building Code are enforced by the Bureau of Building, Housing and Zoning.

Hubert A. Clarke, Jr.
Fire Marshal
D.C. Fire Dept. Headquarters
614 H St., NW, Room 406
Washington, D.C. 20001
(202) 745-2255

Florida: The Treasurer-Insurance Commissioner serves as the state fire marshal. He has the authority to carry firearms and to make arrests, searches, and seizures. He is responsible for fire protection, fire incident reporting, arson investigation, and regulations covering fire extinguishers and fire protection systems, explosives, flammable liquids, and common hazards. The state fire marshal is responsible for setting minimum standards for the employment and training of fire fighters. The State Fire Marshal's Office maintains a State Fire College for training members of the fire service and a laboratory facility for testing fire equipment and evidence obtained in fire investigations.

Dennis R. Dewar
Director
Division of State Fire Marshal
Larson Bldg., Room 458
Tallahassee, FL 32304
(904) 488-8268

Georgia: The Office of State Fire Marshal is under the comptroller general. The Georgia Safety Fire Law contains comprehensive provisions covering the control of flammable liquids and explosives, and it provides for fire investigations and enforcement of arson statutes. The Safety Fire Commissioner promulgates firesafety regulations pertaining to certain buildings and to schools, hospitals, nursing and old age homes, hotels, motels, places of assembly, jails, prisons, and certain other uses. The state has adopted NFPA *101, Life Safety Code* and many NFPA standards relating to construction and hazardous materials. The commissioner promulgates rules and regulations for the licensing of manufactured home dealers and manufacturers.

John R. Gore, Jr.
State Fire Marshal
State of Georgia
State Capitol
Atlanta, GA 30334
(404) 656-2064

Hawaii: On July 1, 1979, the Office of the State Fire Marshal was abolished and all functions and responsibilites were transferred to the respective counties. Responsibilities include investigation of fires; inspection of property; review of construction plans for schools, hospitals, institutions, hotels, places of assembly and office and industrial occupancies; and review of construction plans for flammable liquid and gas installations. A State Fire Council composed of the fire chiefs of the four counties and Chief of the Fire Prevention Bureau of the Honolulu Fire Department adopted a State Model Fire Code which serves as the basis for county fire codes. The State Model Fire Code adopted the Uniform Fire Code. The four counties have also adopted various editions of the Uniform Building Code. Regulation of explosives and blasting agents is the responsibility of the State Department of Labor and Industrial Relations.

Idaho: The Department of Labor and Industrial Service enforces regulations covering building exits and firesafety in state-occupied buildings, as well as electrical wiring, paint spraying, gas welding and cutting, air conditioning, ventilation, blower and exhaust systems in industries, and fireworks. The Commissioner of Law Enforcement is responsible for regulations concerning electrical wiring and LP-Gas in industrial establishments, public buildings, schools, hospitals, and institutions.

William K. Wallis
State Fire Marshal
Idaho Dept. of Insurance
700 W. State St.
Boise, ID 83720
(208) 384-2411

Illinois: The Office of State Fire Marshal has been a separate state agency under the governor since 1977. The state fire marshal, as executive director, is appointed by the governor with the advice and consent of the State Senate. The state fire marshal's responsibilities include fire prevention investigation, recording of Fire Protection Districts, issuing permits for gasoline and flammable liquid storage, assignment of unprotected areas for fire protection, and the collection of fire data, which is performed in accordance with the National Fire Incident Reporting System (NFIRS). The office also has a Division of Personnel Standards and Education which has the responsibility for encouraging local fire departments to improve the training of fire personnel under a career development and certification program. The office also investigates the cause and origin of fires as a member of the Illinois Arson Task Force.

Jack Henry Carter
State Fire Marshal
Office of the State Fire Marshal
Division of Administration
3150 Executive Park Dr.
Spingfield, IL 62706
(217) 782-9889

Indiana: The state fire marshal is responsible for enforcing laws relative to arson, exits, places of public assembly, schools, hospitals, and institutions. There are regulations controlling flammable liquids, LP-Gas, fireworks, and other common fire hazards. There is also a State Building Code enforced by the Administrative Building Council.

William C. Goodwin
State Fire Marshal
State Office Bldg., Room 502
100 N. Senate Ave.
Indianapolis, IN 46209
(317) 633-4778

Iowa: The state fire marshal is in the Department of Public Safety. The Fire Marshal Law contains comprehensive provisions covering arson, explosives, places of public assembly, hospitals, institutions, nursing homes, and fire prevention education. Regulations cover flammable liquids, LP-Gas, building exits, electrical wiring, and other common hazards. The Labor Department regulates industrial processes and electrical wiring in industrial occupancies.
Wilbur R. Johnson
State Fire Marshal
State Office Bldg.
523 E. 12th St.
Des Moines, IA 50319
(515) 281-5821

Kansas: The Office of State Fire Marshal is a separate governmental department reporting directly to the governor. The office is responsible for arson investigation, control of fireworks and explosives, and the promulgation and enforcement of regulations governing bulk oil stations, LP-Gas, retail gasoline stations, and gasoline transport trucks. The fire marshal is also responsible for the inspection of schools, health care facilities, places of assembly, mercantile, office, industrial, storage and miscellaneous structures. Special inspections of hazardous conditions or buildings are made upon request of fire chiefs or other city officials. The Fire Marshal's Office also acts as the focal point for collection and dissemination of fire loss information from fire departments and insurance companies operating in Kansas.
Edward C. Redmon
State Fire Marshal
State Fire Marshal Dept.
Mills Bldg., Suite 203
109 W. 9th
Topeka, KS 66612
(913) 296-3401

Kentucky: The Office of State Fire Marshal is organized under the Department of Housing, Buildings and Construction and is a part of the Public Protection and Regulation Cabinet. The office administers the Kentucky Standards of Safety which include certain codes and standards of the National Fire Protection Association which are filed as part of the body of standards adopted by reference in their entirety. These standards apply where safety to life or protection of the public interest requires their enforcement. The Fire Marshal's Office administers the State Electrical Certification and Inspection program; the Elevator Safety Inspection program; Mobile Home and Recreational Vehicle Certification and the certification and inspection of boilers, pressure vessels, and pressure piping. The Fire Marshal's Office also contains a state-wide hazardous materials response organization on duty 24 hours a day and radio contact with the State Police. This office acts as the administrative arm of the Commission on Fire Protection Personnel Standards and Education.
Gayle F. Horn
State Fire Marshal
Commonwealth of Kentucky
US #127 S
127 South Bldg.
Frankfort, KY 40601
(502) 564-3626

Louisiana: The Office of State Fire Marshal is a separate governmental department reporting directly to the governor. The Fire Marshal Law covers investigation of fires, arson, inspections of buildings, exits, air conditioning systems, and other common hazards. LP-Gas is under the jurisdiction of the LP-Gas Commission.

Carrol L. Herring
State Fire Marshal
Louisiana Dept. of Public Safety
Office of State Fire Protection
1033 N. Lobdell Blvd.
Baton Rouge, LA 70806
(504) 925-4911

Maine: The Office of State Fire Marshal was established in 1973 as a bureau of the Department of Public Safety. The fire marshal or his deputies investigate explosions and suspicious fires and inspect public buildings including schools, hospitals, and nursing homes. They also enforce laws and regulations covering arson, fireworks, dance halls, theaters, explosives, LP-Gas, flammable liquids, and other common hazards. Oil burners and solid fuel central heating installations are regulated by the Oil and Solid Fuel Board and electrical installations by the Electricians Examining Board, both under the Department of Business Regulations.

Donald M. Bisset
State Fire Marshal
Maine Dept. of Public Safety
99 Western Ave.
Augusta, ME 04333
(207) 289-2481

Maryland: The Office of the State Fire Marshal is an Agency of the Department of Public Safety and Correctional Services. The marshal is responsible for enforcing regulations which are promulgated by a State Fire Prevention Commission covering life safety in all structures and installations, flammable liquids, LP-Gas, fire protection equipment, and for enforcement of state statutes covering explosives, electrical safety, fireworks, and arson. The State Building Code applies to state properties only. The Division of Labor and Industry enforces safety and health standards for places of employment.

James C. Robertson
State Fire Marshall
State Office Bldg.
301 W. Preston St.
Baltimore, MD 21201
(301) 383-2520

Massachusetts: The state fire marshal is director of the Division of Fire Prevention which is charged with the enforcement of fire prevention laws, rules, and regulations. This includes the investigation of suspicious fires and explosions and those of undetermined origin, as reported by the local fire authorities. The Division supervises and regulates the transportation, manufacture, storage, and use of explosives and fireworks, and licenses persons engaged in these fields of endeavor and holds hearings arising from appeals from the decisions of local authorities on the storage of flammable and explosive materials. It also maintains statistical reports on fires and explosions and consults with legislators,

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In 1775, before the British marched on Bunker Hill in Boston, they set fire to some 400 dwellings across the bay in Charlestown. This was done more as a diversionary tactic than as punishment, but it served both purposes. The general intent of such burnings in this war, and later in the Civil War, was to break down the will of people residing in the area and create concern among the thousands of volunteer soldiers .... to cause them to desert.

public officials, fire and police departments, and the general public on fire prevention matters throughout the Commonwealth. It also approves devices in certain categories as specified by law, and also passes on construction of tanks and pipelines.

Joseph A. O'Keefe
State Fire Marshal
Massachusetts Dept. of Public Safety
1010 Commonwealth Ave.
Boston, MA 02215
(617) 566-4500

Michigan: The duties and responsibilities of the state fire marshal are assigned to the Department of State Police as a division of that department. The majority of the work performed by the Fire Marshal Division is in arson and fire investigation, firesafety and fire prevention, fire reporting, hazardous materials transportation and storage inspection and enforcement, providing information and consultation to local authorities and groups upon request, and participating in a variety of training and instruction programs on hazardous materials, fire investigation, and firesafety. Within the division is the State Fire Safety Board which is responsible for promulgating rules addressing firesafety requirements for occupancies such as schools, health care facilities, facilities for the mentally retarded, places of public assembly, adult foster care facilities, penal institutions, and drycleaning establishments using flammable liquids. It also regulates the storage, transportation, and handling of all hazardous materials, and promulgates fire inspector training and certification requirements. A Municipal Fire Insurance Rate Classification Advisory Board within the division recommends criteria for assessing the fire fighting capability of municipal fire departments and for reviewing fire insurance risk classifications. Also within the division is a Firefighters Training Council that establishes advisory fire fighter training standards, approves fire fighters' training schools, provides courses of study to fire fighters, trains instructors, and evaluates fire fighter training schools and courses, and presents instruction. A State Construction Code is administered by a Construction Code Commission and encompasses the enforcement of the State Electrical Code through a State Electrical Administrative Board. The Chief of the Fire Marshal Division is an ex-officio member of the Commission.

Captain William R. Rucinski
Chief, Fire Marshal Division
Michigan Dept. of State Police
General Office Bldg.
7150 Harris Dr.
Lansing, MI 48913
(517) 322-1924

Minnesota: The State Commissioner of Public Safety is ex-officio state fire marshal and the functions of this office are handled by an appointed state fire marshal. State statutes cover control of arson, exits, places of public assembly, schools, theaters, drycleaning plants, institutions, and fireworks. There are regulations covering nursing homes, petroleum products and LP-Gas products, natural gas and other common fire hazards. The state adopted amended versions of the Uniform Building Code which is administered by the State Building Code Division. The *National Fire Codes* are enforced by the state fire marshal in conjunction with the Uniform Fire Code.

Wes Werner
State Fire Marshal
Minnesota Dept. of Public Safety
Fire Marshal Division
1246 University Ave.
St. Paul, MN 55104
(612) 296-7643

Mississippi: The State Insurance Commissioner is ex-officio state fire marshal. The fire marshal is responsible for the investigation of incendiary fires and the enforcement of the state-adopted Standard Fire Prevention Code. The LP-Gas regulations are enforced by a division of the State Department of Finance.

George Dale
Commissioner of Fire Insurance and
State Fire Marshal
State of Mississippi
416 Woolfolk Bldg.
Jackson, MS 39205
(601) 354-6304

Missouri: There is an Office of State Fire Marshal within the Department of Public Safety which investigates only those fires which are arson or which are suspected to be arson. By statute, the agency is a criminal investigation unit dealing with the crime of arson. The fire marshal and his investigators are armed and they have full powers of arrest, search and seizure, and subpoena. There is no state fire code. Local political subdivisions have the authority to enact and enforce fire prevention ordinances under state law. However, fire inspectors from the fire marshal's office inspect premises which are licensed by the State Department of Mental Health and the State Division of Family Services.

James J. Helbig
State Fire Marshal
Missouri Dept. of Public Safety
P.O. Box 844
505 Missouri Blvd.
Jefferson City, MO 65102
(314) 751-2930

Montana: The state fire marshal is under the State Attorney General and is part of the State criminal justice system. The fire marshal is authorized to carry firearms, make arrests, search and seize, to enjoin the use of buildings, and to restrain certain activity until compliance is met. He is authorized by statute to adopt and promulgate firesafety regulations with the advice of the State Fire Prevention Advisory Commission. The fire marshal is responsible for fire protection, fire and arson investigation, explosives, fireworks, flammable liquids, LP-Gas, and a fire reporting system. The State Building Code Director enforces building and electrical codes. Local jurisdictions may adopt and enforce the State Building Codes.

Robert Kelly
State Fire Marshal
State of Montana
Fire Marshal Bureau
1409 Helena Ave.
Helena, MT 59601
(406) 449-2050

Nebraska: The state fire marshal enforces laws relating to arson and fire investigation, promotes firesafety, and prepares and enforces regulations covering fire prevention; storage and handling of flammable and combustible liquids; life safety in places of assembly, and educational, institutional, residential, mercantile, office, storage, and industrial occupancies; storage and handling of LP-Gas and other hazardous materials, and the inspection of licensed care facilities. The fire marshal's office delegates to local

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In 1881, brass poles were introduced in Worcester, Massachusetts, and soon after became standard fire station equipment.

authorities enforcement of its regulation. NFPA 101, *Life Safety Code* is generally the basis for life safety regulations prepared by the fire marshal's office.

Wallace M. Barnett
State Fire Marshal
State Office Bldg.
301 Centennial Mall S, 6th Floor
P.O. Box 94677
Lincoln, NE 68509
(402) 471-2027

Nevada: The Nevada State Fire Marshal Division is in the Department of Commerce. The fire marshal is empowered by statute to promulgate regulations relative to arson, fire prevention, fire extinguishers and systems, sprinkler and alarm systems, flammables, fireworks, explosives, adequacy of exits. He also approves licensing for the safety of patients in all state-licensed health care facilities. He is also empowered to promulgate or adopt construction standards for mobile homes, factory-built housing and manufactured buildings. He is required by statute to license fire extinguisher service agencies and servicemen, fire alarm and sprinkler system installation and service companies. LP-Gas regulations are enforced by the State LP-Gas Board. Tank vehicle regulations are enforced by the Public Service Commission.

Tom J. Huddleston
State Fire Marshal
State Fire Marshal Division
Capitol Complex, Kinkead Bldg.
505 E. King St.
Carson City, NV 89710
(702) 885-4290

New Hampshire: The state fire marshal is under the supervision of the Director of Safety Services. The state fire laws cover control of arson, fireworks, exits, construction of buildings, places of public assembly, hospitals, institutions, and nursing homes. There are standards covering flammable liquids, explosives, LP-Gas, and other common hazards.

Raymond T. Dewhurst
State Fire Marshall
New Hampshire Dept. of Safety
James H. Hayes Bldg.
Hazen Dr.
Concord, NH 03301
(603) 271-3336

New Jersey: The Office of the State Fire Marshal is organized under the New Jersey Department of Law and Public Safety by Executive Order No. 84. The Office is responsible for the fire protection and inspections of all state-owned, -leased and -occupied buildings. It also oversees fire data collection using the National Fire Incident Reporting System. Arson investigations are conducted by the New Jersey State Police Arson Unit. New Jersey has adopted the B.O.C.A. Basic Building Code, which is administered by the New Jersey Department of Community Affairs, which also regulates multiple dwellings. Fireworks laws are under the jurisdiction of the New Jersey Department of Labor and Industry. LP-Gas installation standards are enforced by the State Police. Forest Fire Service is in the Department of Environmental Protection. Private

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The fire department headquarters in Arlington, Massachusetts is probably the only octagonal-shaped fire station in the country. This design, fashioned in the 1920s by architect George Ernest Robinson, enabled returning fire engine drivers to drive the trucks through the station instead of having to back them in. However, this idea of the drive-through station did not catch on until the 1960s.

hospitals, nursing homes and boarding homes are regulated by the New Jersey Department of Health. Motor vehicles are controlled by the Division of Motor Vehicles.

John McQuade
State Fire Marshal
New Jersey Dept. of Law and
Public Safety
State House
Trenton, NJ 08625
(609) 882-2000

New Mexico: The Superintendent of Insurance is also state fire marshal. The Fire Marshal Law covers investigation of fire hazards, fire prevention education in the schools, and training of fire fighters. The fire marshal is also responsible for the investigation of all fires of suspicious origin, and for promulgating rules and regulations relating to life safety in public occupancies. Flammable liquid regulations are enforced by the fire marshal. The electrical code is enforced by the Electrical Administration Board, firesafety in hospitals and institutions by the Contractor's License Board, drycleaning regulations by the Dry Cleaning Board, and LP-Gas firesafety regulations by the LP-Gas Commission. The Fireworks Law is enforced on the local level.

Robert Baca
Deputy State Fire Marshal
State of New Mexico
Office of the Fire Marshal
P.O. Drawer 1269
Sante Fe, NM 87501
(505) 827-2357

New York: The Department of State, Office of Fire Prevention and Control, under the State Fire Administrator, has statutory responsibility to advise, assist and/or coordinate arson suppression, detection, investigation, and prosecution. The office provides fire prevention education and technical assistance activities to all levels of state and local government. Full-time state senior training technicians conduct specialized and advanced training at the local level. On the county level, the office provides a central, statewide data and training records capability, film library, student workbooks, lesson plans, and instructor development programs for state training. The office operates the Academy of Fire Science which conducts on-site programs for all levels of fire service personnel, as well as other public officials and agencies. In addition, the State Fire Administrator administers the mandatory minimum training standards for paid fire fighters.

There is a uniform State Building Code, drafted and revised periodically by a unit of the State Division of Housing and Community Renewal, which local municipalities may adopt and enforce. There is a companion State Fire Prevention Code which may be similarly adopted and enforced on the local level. The State Fire Administrator has final approval of the Fire Prevention Code's contents.

The State Health Department has jurisdiction over transient-type occupancies for firesafety and health codes. The State Labor Department has jurisdiction over firesafety requirements for business and industrial establishments and certain places of public assembly. The transportation of explosives is also controlled, to some degree, by the Labor Department. The State Commissioner of Education has some jurisdiction over public school buildings and to some degree over buildings of private schools licensed by him. The State Commissioners of Health and Mental Hygiene are responsible for firesafety in state hospitals under their respective jurisdictions. The State Commissioner of Social Services is responsible for firesafety in certain institutions which fall within his area of operation.

Nursing home and hospital firesafety is the responsibility of the Department of Health. New York has not adopted the Uniform Arson Law but has adopted a State Fireworks Law.

Francis A. McGarry
State Fire Administrator
New York Dept. of State
Office of Fire Prevention and Control
162 Washington Ave.
Albany, NY 12231
(518) 474-6746

North Carolina: The Commissioner of Insurance is the state fire marshal. The use of fireworks is banned except that permission for use of fireworks at public displays may be obtained from the Board of County Commissioners. The Commissioner of Insurance has the responsibility for administration and enforcement of a statewide building code which applies to all types of buildings throughout the state including assemblies, schools, hospitals and institutional buildings. A Deputy Commissioner of Insurance serves as Director of the Division and also serves as secretary to the Statewide Building Code Council. The Department of Insurance is also responsible for regulations for mobile home construction and the Commissioner of Agriculture is responsible for LP-Gas Regulations. The state fire laws cover control of arson and are enforced by the State Bureau of Investigation.

Kern Church
Chief Deputy State Fire Marshal
State of North Carolina
Box 26387
Raleigh, NC 27611
(919) 733-3901

North Dakota: The state fire marshal is head of the Fire Marshal Department, which is organized under the Attorney General. Fire laws cover arson, fireworks, explosives, construction of schools, fire escapes and exits, electrical wiring, and other common hazards. Regulations of the fire marshal cover fire extinguishers, LP-Gas, nursing homes, and hospitals.

John D. Jansen, Jr.
State Fire Marshal
State of North Dakota
Criminal Identification Bldg.
Lock Box 1292
Bismark, ND 58501
(701) 224-2434

Ohio: The Division of State Fire Marshal is a part of the Department of Commerce and is headed by the state fire marshal. Within the division are the Arson Bureau, Arson Crime Laboratory Bureau, Fire Prevention Bureau, and Inspection Bureau. In addition, the state fire marshal operates the Ohio Fire Academy. The fire marshal adopts and enforces the Ohio Fire Code, investigates fires and explosions, prosecutes arsonists, compiles fire loss statistics, educates the public in firesafety, licenses hotels, and certifies persons who service, test, repair, or install fire protection equipment. The B.O.C.A. Basic Fire Prevention Code has been adopted as the Ohio Fire Code, except for those portions expressly modified or deleted. The Inspection Bureau inspects or causes to be inspected buildings and other places, except single-family dwellings and units in two-family and multi-family dwellings, for compliance with the Ohio Fire Code. It is particularly concerned with assuring firesafety in hotels, nursing homes, hospitals, schools, and places for public assemblage. Firesafety inspectors must be certified in the State of Ohio. The Division of Factory and Building Inspection, Department of Industrial Relations, enforces the Ohio Basic Building Code.

William B. Sanders
State Fire Marshal
Department of Commerce
Division of State Fire Marshal
8895 E. Main St.
Reynoldsburg, OH 43068
(614) 864-5510

Oklahoma: The State Fire Marshal Agency is a separate and independent agency in the State Government. A five-member Fire Marshal Commission appoints the state fire marshal and the fire marshal answers directly to the Commission. The Commission is empowered by state statutes to adopt and promulgate rules and regulations related to the general areas of responsibility of the fire marshal. NFPA *National Fire Codes* are adopted by reference, also the B.O.C.A. Basic Building Code. The agency conducts plans review, makes firesafety inspections, including inspection of health care facilities for Medicare and Medicaid approval, and enforces the provisions of NFPA 30, *Flammable and Combustible Liquids Code*. The agency is responsible for fire investigation, including investigations under the State Arson Law. Investigators are certified State Peace Officers.

Jack C. Sanders
State Fire Marshal
State of Oklahoma
4040 N. Lincoln Blvd., Suite 100
Oklahoma City, OK 73105
(405) 424-4371

Oregon: The Office of State Fire Marshal is organized as a division of the Department of Commerce. Fire laws contain provisions covering arson, fire investigation and reporting, exits, places of public assembly, schools, hospitals and institutions including Medicare-Medicaid surveys, storage and handling of flammable and combustible liquids, liquefied petroleum gases, liquefied natural gas, storage and handling of explosives and blasting agents, and all other buildings except private one- and two-family dwellings. Laws provide for rural fire protection districts, mutual aid agreements, and fire fighter training. The *National Electrical Code* is enforced by the State Building Codes Division of the Department of Commerce. The transportation of flammable liquids is the responsibility of the Public Utilities Commission.

Olin Greene
State Fire Marshal
Department of Commerce
Office of State Fire Marshal
103 Labor & Industries Bldg.
Salem, OR 97310
(503) 378-4917

Pennsylvania: The officer in charge of the Bureau of Fire Protection of the State Police is the state fire marshal. The Fire Prevention Act provides for the investigation of fires and arson, regulations for flammable liquids, and the removal of certain fire hazards. There is a Fireworks Law, as well as an Arson Law. The Department of Labor and Industry is charged with the enforcement of building regulations for protection from fire

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The famous confrontation known as the "Boston Massacre" in 1770 occurred when the ringing of the fire bell brought a crowd of young, aggressive male colonists who hooted, jeered, and ridiculed British troops.

and panic; comprehensive regulations are issued. The Hazardous Substances Transportation Board issues regulations covering the transportation of hazardous substances.

Charles A. Henry
State Fire Commissioner
Pennsylvania Emergency Management Agency
Office of Fire Safety Services
P.O. Box 3321
Harrisburg, PA 17105
(717) 787-1324

Rhode Island: The Office of State Fire Marshal operates within the Division of Firesafety which is part of the State Executive Department. The state fire laws contain provisions covering control of arson, fireworks, exits, places of public assembly, schools, hospitals, institutions, theaters, and garages. There are regulations covering flammable liquids, LP-Gas, and other common fire hazards. The fire marshal's office enforces the firesafety laws, promulgates and enforces regulations, investigates arson and conducts firesafety inspections of buildings.

Earl F. Shannon
State Fire Marshal
Rhode Island Division of Fire Safety
12 Humbert St.
North Providence, RI 02911
(401) 277-2335

South Carolina: The Division of State Fire Marshal functions within the Budget and Control Board under the office of Executive Director. The fire marshal is appointed by the Budget and Control Board. Rules and regulations covering common hazards are formulated by the State Fire Commission. LP-Gas and anhydrous ammonia are also controlled within the Division of State Fire Marshal under the direction of a duly established Licensing Board. Hospital and nursing home facilities are inspected and licensed by the State Department of Health and Environmental Control. Arson Laws are enforced by the South Carolina Law Enforcement Division.

Richard S. Campbell
State Fire Marshal
Division of State Fire Marshal
Budget and Control Board
1109 Belleview St.
Columbia, SC 29201
(803) 758-2941

South Dakota: The state fire marshal operates within the Department of Public Safety. The fire marshal's powers include investigation of fire and arson, annual inspection of schools, inspection of state-owned buildings, LP-Gas bulk plants and flammable liquids plants, regulation of explosives, licensing of the sale or issuance of fireworks, and administration of pipeline safety and boiler safety programs. The state has adopted NFPA 101, *Life Safety Code*, and the fire marshal's office maintains a statewide fire reporting system.

Gene Uthe
State Fire Marshal
South Dakota Dept. of Public Safety
118 West Capitol
Pierre, SD 57501
(605) 773-3562

Tennessee: The Division of Fire Prevention, also known as the State Fire Marshal's Office, is administered through the director for the Commissioner of Insurance, State of

Tennessee. The laws and regulations enforced by the State Fire Marshal's Office cover arson and fraud as related to arson, LP-Gas explosives and other common hazardous materials, the mobile home industry (both manufacturers and dealers) and the licensing and registration of all health care and educational facilities, and review construction drawings on related buildings. The Electrical Inspection Section inspects all electrical installations in the state.

H. B. McPherson
State Fire Marshal
Tennessee Department of Insurance
Division of Fire Prevention
306 Gay St.
Nashville, TN 37201
(615) 741-2981

Texas: The State Board of Insurance appoints the state fire marshal, who enforces regulations covering the control of arson, exits, flammable liquids, fire extinguishers and systems, fire alarm systems, fireworks, and other common fire hazards. The *National Fire Codes* are utilized by the State Fire Marshal as recommended standards of good practice. The State Fire Marshal manages and supervises the National Fire Incident Reporting System (NFIRS) program for the State of Texas. The control of liquefied petroleum (LP-) gas, as well as natural gas, is the responsibility of the Railroad Commission of Texas. Fire protection guidelines for hospitals and nursing homes are created by the State Department of Health. The Department of Public Safety regulates the transportation of explosives and irradiated materials over Texas highways. Mobile home regulations are adopted and enforced by the Manufactured Housing Division of the Texas Department of Labor and Standards.

Ernest A. Emerson
State Fire Marshal
State Board of Insurance
1110 San Jacinto
Austin, TX 78786
(512) 475-4203

Utah: An appointed State Fire Prevention Board oversees the activities of the State Fire Marshal's Office, which is a separate agency reporting directly to the governor. The Board has authority to adopt rules and regulations pertaining to firesafety and life safety in all public assembly, educational, institutional, and state-owned occupancies. The fire marshal has code-enforcing authority in all public schools and state-owned buildings throughout the state, and all occupancies listed above in unincorporated areas. The fire marshal also assumes responsibility for the investigation of suspicious fires statewide. The Fire Prevention Board is also responsible for drafting for recommendation to political subdivisions throughout the state, codes and regulations relating to firesafety and life safety in all buildings, and in the use of handling of chemical, gaseous, explosive, radioactive, and other hazardous substances. State laws, rules and regulations have been adopted pertaining to fire extinguisher servicing, fireworks, explosives, arson, and foamed plastic insulation.

Steve M. Kennedy
State Fire Marshal
Utah Department of Public Safety
4501 South - 2700 W
Salt Lake City, UT 84119
(801) 965-4353

Vermont: The Office of State Fire Marshal is part of the Bureau of Criminal Investigation of the Vermont State Police. The fire marshal investigates only arson and other criminal burnings. The firesafety codes are mostly NFPA standards and are enforced by the Fire Prevention Division of the Department of Labor and Industry. Regulations cover fire alarm systems, nursing homes, heating equipment, exits, LP-Gas, chimneys, flammable liquids, and other fire hazards.

Paul R. Philbrook
Commissioner of Public Safety and
State Fire Marshal
State of Vermont
State St.
Montpelier, VT 05602
(802) 828-2106

Virginia: The Office of State Fire Marshal is located in the Division of Building Regulatory Services within the Department of Housing and Community Development. The laws cover safety to life and property in public buildings (buildings occupied by 10 or more people except one-, two- and three-family dwellings). The fire marshal also investigates complaints of flammable or combustible conditions and has authority to require such alterations as he may deem necessary to abate the hazard.

Howard H. Summers, Jr.
Chief Fire Marshal
Office of the State Fire Marshal
Virginia Department of Housing and
Community Development
205 N. Fourth St.
Richmond, VA 23219
(804) 786-4751

Washington: The State Insurance Commissioner is ex-officio state fire marshal. The fire marshal is responsible for enforcing state laws and regulations concerning arson and fireworks. He is also responsible for firesafety and life safety in hospitals, nursing homes and boarding homes, transient accommodations, private establishments, and child-care facilities. The state fire marshal administers the State Fire Reporting Law (state counterpart of NFIRS) and issues an annual report and firesafety information to the fire service and general public. The state fire marshal also aids in the enforcement of local fire codes. There is a state building code enforced by each city, town, and county. The Department of Labor and Industries regulates LP-Gas, electrical installations, and explosives storage and handling. The state patrol regulates transportation of explosives.

Thomas R. Brace
Director, Division of State Fire Marshal
State of Washington
Insurance Bldg., Room 325
Olympia, WA 98504
(206) 753-3605

West Virginia: The state fire marshal is appointed in accordance with the qualifications approved by the State Civil Service Commission by the State Fire Commission and is under the direction of the State Fire Commission. The state fire marshal shall enforce all laws of the state having to do with: prevention of fire; the storage, sale, and use of any explosive, combustible, or other dangerous article in solid, flammable liquid or gas form; the installation and maintenance of equipment of all sorts intended to extinguish, detect, and control fires; the means and adequacy of exits from buildings, and the suppression of arson. The state fire marshal enforces the state fire code throughout the state as promulgated by the State Fire Commission. The State Fire Code has adopted the *National Fire Codes*. Licensing of electricians is the responsibility of the state fire marshal. Jurisdiction of state fire marshal covers all occupancies except one- and two-family dwellings in regard to State Fire Code requirements.

Walter Smittle III
State Fire Marshal
State of West Virginia
2000 Quarrier St.
Charleston, WV 25305
(304) 348-2191

Wisconsin: The Arson Bureau is in the Department of Justice. The administrator of the Division of Criminal Investigation is the state fire marshal. Duties and functions of the office are carried out by the director of the Arson Bureau. The principle duty of the state fire marshal is the investigation of arson fires and criminal explosions. There is an Arson Law. Fire prevention laws and regulations are administered by the Fire Prevention Division of the Department of Industry, Labor, and Human Relations, which has jurisdiction over public buildings, schools, hospitals, factories, stores, apartments, etc. There is a Fireworks Law, a State Building Code, and a Heating and Ventilating Code.

Philip C. Culp
Director, Arson Bureau
123 W. Washington Ave., Room 415
Madison, WI 53702
(608) 266-1671

Wyoming: The state fire marshal is appointed by the governor and directs the Department of Fire Prevention and Electrical Safety. The fire marshal appoints the head of the Fire Prevention Division and the Electrical Safety Division. The duties of the fire marshal include inspecting public, business, and industrial buildings; enforcing the arson laws; condemning unsafe buildings; overseeing the licensing of electricians; and reviewing construction plans for compliance with the building codes and fire codes and the Public Handicapped Law. Fireworks laws are enforced by local authorities.

Billy M. Weckwerth
State Fire Marshal
Department of Fire Prevention and
Electrical Safety
720 W. 18th St.
Cheyenne, WY 82002
(307) 777-7288

State Forest Fire Supervisors

Alabama
Richard Cumbie, Director
Forest Rescue Protection Division
Alabama Forestry Commission
513 Madison Ave.
Montgomery 36104
(205) 832-6587

Alaska
Ray Settles
Fire Management Forester
Division of Lands
323 E. Fourth Ave.
Anchorage 99501

Arizona
Bruce DeVault, Chief
Protection Section
State Land Dept.
1524 W. Adams
Phoenix 85007
(602) 271-4059

Arkansas
Warren Smith
Protection Forester
Arkansas Forestry Commission
P.O. Box 4523, Asher Station
Little Rock 72214
(501) 371-1734

California
Mike Schori
Chief of Fire Protection
Dept. of Forestry
Resources Agency
1416 Ninth St., Room 1505
Sacramento 95814
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Colorado
Ron Zeleny
Staff Forester
Fire Protection
Colorado State Forest Service
Colorado State University
Fort Collins 80523
(303) 482-8185
(303) 491-6303

Connecticut
Charles Snyder
Fire Control Officer
Dept. of Environmental Protection
Forestry Unit
State Office Bldg.
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Delaware
Tim Kaden
Fire Control Supervisor
Dept. of Agriculture
Forestry Section, Drawer D
Dover 19901
(302) 678-4419

Florida
Mike Long
Chief of Fire Control Bureau
Division of Forestry
Dept. of Agriculture & Consumer Services
Collins Building
Tallahassee 32301
(904) 488-6111

Georgia
James Turner, Jr.
Chief, Forest Protection
Georgia Forestry Commission
P.O. Box 819
Macon 31202
(914) 744-3237

Guam
Robert Withrow
Fire Control Officer
Forestry & Soil Resource Division
Government of Guam
Agana 96910

Hawaii
Bill Seager
Protection Forester
Division of Forestry
1151 Punchbowl St.
Honolulu 96813
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Idaho
John Crumb, Chief
Bureau of Forest Fire Protection
Idaho Dept. of Lands
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Coeur d'Alene 83814
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Illinois
Dave Gillespie
Fire Supervisor
Illinois Dept. of Conservation
Division of Forestry
Rt. 5 Conservation Area
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Indiana
Steve Creech
Fire Coordinator
Division of Forestry
Dept. of Natural Resources
613 State Office Bldg.
Indianapolis 46204
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Iowa
Roy Hatcher
Protection & Utilization Forester
Iowa Conservation Commission
Wallace State Office Building
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Kansas
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Dept. of Forestry
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Manhattan 66502
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Kentucky
Joe Dietz
Chief of Fire Control
Division of Forestry
Dept. of Natural Resources & Environmental Protection
618 Teton Trail
Frankfort 40601
(502) 564-4496

Louisiana
Lambert Tomero
Chief of Forest Protection
Office of Forestry
Dept. of Natural Resources
P.O. Box 1628
Baton Rouge 70821

Maine
Earle Williams
Staff Fire Officer
Bureau of Forestry
State Office Building
Augusta 04333
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Maryland
James Roberts, Chief
Forest Protection
Maryland Forest Service
Twawes State Office Bldg.
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Massachusetts
Sidney Thompson
Chief Fire Warden
Dept. of Environmental Management
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Michigan
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Forest Fire Supervisor
Dept. of Natural Resources
Forest Management Division
Box 30028
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Tom Hardage
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Mississippi Forestry Commission
908 Robert E. Lee Bldg.
Jackson 39201
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Missouri
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Assistant State Forester
Missouri Dept. of Conservation
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Montana
Richard Sandman, Chief
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Nebraska
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Fire Coordinator
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(402) 472-2944
(402) 472-2963

Nevada
Don Amodei
Assistant State Forester
Nevada Division of Forestry
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Carson City 89710
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(702) 784-6311 24-hour in Reno

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Jack Sargent
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Division of Forest & Lands
Dept. of Resources & Economic Development
State House Annex, Box 856
Concord 03301
(603) 271-2218

New Jersey
James Cumming, Jr.
Fire Control Officer
Bureau of Forestry
Dept. of Environmental Protection
Division of Parks & Forestry
P.O. Box 2808
Trenton 08625
(609) 292-2977

New Mexico
Frank Smith
Chief of Fire Management
Dept. of State Forestry
Sante Fe 87503
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New York
Charles Boone
Superintendent
Forest Fire Control
Dept. of Environmental Conservation
Forest Resources
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Fire Statistics

Highlights of 1981 U.S. Fire Experience*

- 6,700 civilians died as a result of fires in the United States in 1981, an increase of 195 deaths or 3.0 percent from 1980.
- 5,540 of the civilian fire deaths occurred as a result of residential fires in 1981, a slight increase of 1.7 percent from 1980; residential fires accounted for 82.7 percent of all civilian fire deaths in 1981.
- 4,430 of the civilian fire deaths occurred in one- and two-family dwellings, an increase of 6.1 percent from 1980; 970 civilians died in apartment fires, a decrease of 5.4 percent from 1980.
- 770 civilian fire deaths were the result of highway vehicle fires, an increase of 18.5 percent from 1980.
- Fires in nonresidential structures accounted for 220 civilian deaths in 1981, a decrease of 3.9 percent from 1980.
- 820 civilian fire deaths, 14.2 percent of total fire deaths in structures, occurred as a result of incendiary or suspicious fires, an increase of 6.5 percent from 1980. There were 154,500 incendiary or suspicious fires in structures, an increase of 5.8 percent from 1980. These fires caused property loss of $1,658,000,000, a decrease of 5.8 percent from 1980.
- 123 fire fighters died in the line of duty in 1981, a decrease of 8.2 percent from 1980.
- 30,450 civilians were injured in fires in the U.S. during 1981, a slight increase of 0.8 percent from 1980. This estimate for civilian injuries is on the low side, due to underreporting of civilian injuries to the fire service.
- 103,340 fire fighter injuries occurred in the line of duty, an increase of 5.4 percent from 1980.
- 2,893,500 fires were attended by fire departments, a decrease of 3.5 percent from 1980.
- There was an estimated $6,676,000,000 in property damage from fire in the U.S. during 1981, an increase of 6.7 percent from 1980.
- The largest and smallest communities experienced the highest fire incident rates and the smallest communities (under 5,000) experienced the highest fire death rates.
- The Northeast and South generally experienced higher fire incident rates and higher fire death rates than other regions.

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*Michael J. Karter Jr., "Fire Loss in the United States During 1981," *Fire Journal*, Vol. 76, No. 5 (September 1982), p. 68. The 1981 NFPA National Fire Experience Survey was supported in part through the funding of a data exchange agreement between the NFPA and the United States Fire Administration of the Federal Emergency Management Agency. This continuing cooperative effort is in the interest of better understanding and alleviating the fire problem in the United States and is greatly appreciated by the Association.

For the past several years, the annual NFPA National Fire Experience Survey has been supported in part through the funding of a data exchange agreement between the NFPA and the Federal Emergency Management Agency (FEMA). Under this agreement, the Survey data have also been made available for analysis by FEMA. Cooperation between the NFPA and FEMA was expanded to include joint reporting on the Fire Problem. Part I of the joint NFPA/FEMA report on the United States Fire Experience for 1981 appeared in the September 1982 issue of *Fire Journal*. Part II of the joint report appeared in the November 1982 issue of *Fire Journal*.

Fire fighters extinguish flames in one of over 100 homes that were damaged or destroyed after a gas line ruptured in Centralia, MO. A city employee reportedly cut into a pipe causing a break which sent high pressure surges of natural gas into the homes igniting gas appliances. Damage was estimated at $1.5 million. (Columbia Daily Tribune, Columbia, MO)

Other Fire Department Responses

In addition to fires, fire departments responded to the following estimated type and number of incidents in 1981:

Medical aid responses (ambulance, EMT, rescue)	5,019,000
Malicious false alarm responses (fire and nonfire)	788,000
Mutual aid or assistance responses	349,500
All other responses (service calls, arcing wires, washdowns, etc.)	1,544,500
Total Nonfire Incidents:	7,701,000

WE WANT TO KNOW . . .

if a name, an address, or a phone number has changed; if there's an upcoming event, a new program or course, a new publication being offered. If you have more current information than is contained in this *Almanac*, know something that should be included in this book, or just have something interesting about the fire protection scene that you want to contribute, please let us know. Write: Editor, *Fire Almanac*, NFPA, Batterymarch Park, Quincy, MA 02269. All suggestions will receive our careful attention.

ESTIMATES OF 1981 UNITED STATES CIVILIAN FIRE DEATHS AND INJURIES FOR SELECTED PROPERTY USE CATEGORIES

	Civilian Deaths			Civilian Injuries		
Property Use	Estimate	Change from 1980	% of all Civilian Deaths	Estimate	Change from 1980	% of all Civilian Injuries
Residential (total)	5,540	+ 1.7%	82.7%	20,375	- 3.4%	67.0%
One- and Two-Family Dwellings[1]	4,430	+ 6.1%	66.1%	14,875	- 7.6%	48.9%
Apartments	970	- 5.4%	14.5%	4,250	+18.1%	14.0%
Hotels and Motels	90	-45.5%	1.4%	850	-20.9%†	2.8%
Other Residential	50	-38.2%	.7%	400	+23.1%	1.3%
Non-Residential Structures[2]	220	- 3.9%	3.3%	5,325	+46.9%‡	17.5%
Highway Vehicles	770	+18.5%	11.5%	2,900	+ 1.8%	9.5%
Other Vehicles[3]	70	-22.2%	1.0%	500	-59.2%	1.6%
All Other[4]	100	+13.6%	1.5%	1,350	- 3.6%	4.4%
Total	6,700	+ 3.0%		30,450	+ .8%	

Estimates are based primarily on data reported to the NFPA by fire departments that responded to the 1981 National Fire Experience Survey; some of the estimates are based on data reported to the NFPA in the FIDO (Fire Incident Data Organization) System.

[1] Includes mobile homes.

[2] Includes public assembly, educational, institutional, stores and offices, industry, utility, storage, and special structure properties.

[3] Includes trains, boats, ships, aircraft, farm vehicles, and construction vehicles.

[4] Includes outdoor properties with value, brush, rubbish, and other.

†Change was statistically significant at the .05 level.

‡Change was statistically significant at the .01 level.

ESTIMATES OF 1981 UNITED STATES FIRES AND PROPERTY LOSS BY TYPE OF FIRE

	Number of Fires		Property Loss[1]	
Type of Fire	Estimate	Change from 1980	Estimate	Change from 1980
Fires in Structures	1,027,500	- 3.5%	$5,976,000,000	+ 9.6%‡
Fires Outside of Structures with value involved but no vehicle (outside storage, crops, timber, etc.)	81,000	- 6.4%	61,000,000	+ 0.0%
Fires in Highway Vehicles	453,000	- .7%	500,000,000	+ 8.2%+
Fires in Other Vehicles[2]	13,500	-12.9%	94,000,000	-51.1%
Fires in Brush, Grass Wildland (excluding crops and timber), with no value or loss involved	711,000	- 1.0%	—	—
Fires in Rubbish including dumpsters (outside of structures), with no value or loss involved	341,000	-14.1%‡	—	—
All Other Fires	266,500	+ 6.8%	45,000,000	-16.7%
Total	2,893,500	- 3.5%†	$6,676,000,000	+ 6.7%

The estimates are based primarily on data reported to the NFPA by fire departments that responded to the 1981 National Fire Experience survey; adjustments are made based on data reported to the NFPA in the FIDO (Fire Incident Data Organization) System.

[1] Includes overall direct property loss and loss to contents, structure, a vehicle, machinery, vegetation, or anything else involved in a fire and does not include indirect losses, e.g., business interruption or temporary shelter costs; no adjustment was made for inflation in the year to year comparison.

[2] Includes trains, boats, ships, aircraft, farm vehicles, and construction vehicles.

†Change was statistically significant at the .05 level.

‡Change was statistically significant at the .01 level.

ESTIMATES OF 1981 UNITED STATES STRUCTURE FIRES AND PROPERTY LOSS BY PROPERTY USE

	Structure Fires		Property Loss[1]	
Property Use	Estimate	Change from 1980	Estimate	Change from 1980
Public Assembly	28,500	1.7%	$356,000,000	+ 9.2%
Educational	19,500	0.0%	184,000,000	+82.2%†
Institutional	27,000[2]	- 3.6%	38,000,000	+52.0%
Residential (Total)	733,000	- 3.2%	3,259,000,000	+ 7.1%†
One- and Two-Family Dwellings[3]	574,000	- 2.8%	2,713,000,000	+10.9%‡
Apartments	137,000	- 4.5%	415,000,000	+ 3.5%
Hotels and Motels	11,500	0.0%	99,000,000	-35.7%†
Other	10,500	-12.5%	32,000,000	-20.0%
Stores and Offices	65,500	+ 5.6%	642,000,000	- .5%
Industry, Utility, Defense[4]	49,000	-10.9%	775,000,000	+15.3%
Storage in Structures[4]	62,000	- 5.3%	616,000,000	+20.3%
Special Structures	43,000	-11.3%	106,000,000	-19.1%
Total	1,027,500	- 3.5%	$5,976,000,000	+ 9.6%†

The estimates are based primarily on data reported to the NFPA by fire departments that responded to the 1981 National Fire Experience Survey; adjustments are made based on data reported to the NFPA in the FIDO (Fire Incident Data Organization) System.

[1] Includes overall direct property loss — loss to contents, structure, a vehicle, machinery, vegetation, or anything else involved in a fire, and does not include indirect losses, e.g., business interruption or temporary shelter costs; no adjustment was made for inflation in the year to year comparison.

[2] A further breakdown can be made for health care (24,500) and penal (2,500).

[3] Includes mobile homes.

[4] Since some incidents for these property uses were handled only by private fire brigades or fixed suppression systems and were not reported to the NFPA, the results represent only a portion of U.S. Fire Experience.

†Change was statistically significant at the .05 level.

‡Change was statistically significant at the .01 level.

ESTIMATES OF 1981 UNITED STATES FIRES, DEATHS, AND DIRECT PROPERTY LOSS FOR INCENDIARY AND SUSPICIOUS FIRES IN STRUCTURES

	Number of Fires		Number of Civilian Deaths		Direct Property Loss[1]	
Type of Fire	Estimate	Change from 1980	Estimate	Change from 1980	Estimate	Change from 1980
Structure Fires of Incendiary Origin	88,000	- 4.4%	555	- 5.9	$1,142,000,000	- 1.4%
Structure Fires of Suspicious Origin	66,500	+23.1%	265	+47.2%	$516,000,000	-14.3%
Total Structure Fires of Incendiary and Suspicious Origin	154,500	+ 5.8%	820	+ 8.5%	$1,658,000,000	- 5.8%

The estimates are based on data reported to the NFPA by fire departments that responded to the 1981 National Fire Experience Survey.

[1] Includes overall direct property loss — loss to contents, structure, a vehicle, machinery, vegetation, or anything else involved in a fire, and does not include indirect losses, e.g., business interruption or temporary shelter costs; no adjustment was made for inflation in the year to year comparison.

The changes from 1980 were examined for their statistical significance, and were found not to be significant at the .05 level.

NUMBER OF FIRES PER THOUSAND POPULATION (1981) OVERALL AND REGION OF THE COUNTRY BY POPULATION OF COMMUNITY

Population of Community	Overall	Region			
		Northeast	Northcentral	South	West
500,000 or more	12.95	—	15.28	14.54	8.52
250,000 to 499,999	12.89	18.14	13.01	11.05	13.35
100,000 to 249,999	12.39	25.47	9.89	12.52	9.14
50,000 to 99,999	11.48	19.01	9.13	12.20	8.64
25,000 to 49,999	11.35	18.15	9.06	12.52	9.05
10,000 to 24,999	11.29	13.97	9.33	13.64	9.39
5,000 to 9,999	11.67	13.93	9.04	13.28	11.66
2,500 to 4,999	13.08	12.51	10.56	17.15	16.45
under 2,500	16.47	16.03	13.71	22.28	18.31

Source: NFPA's Survey of Fire Departments for 1981 U.S. Fire Experience.
There was insufficient data for communities reporting in the Northeast 500,000 or more category

NUMBER OF CIVILIAN DEATHS PER MILLION POPULATION (1981) OVERALL AND REGION OF THE COUNTRY BY POPULATION OF COMMUNITY

Population of Community	Overall	Region			
		Northeast	Northcentral	South	West
500,000 or more	30.13	—	49.18	24.04	16.13
250,000 to 499,999	33.11	45.94	38.76	29.39	28.17
100,000 to 249,999	29.62	57.03	19.33	35.52	16.15
50,000 to 99,999	24.25	23.52	27.60	30.13	15.84
25,000 to 49,999	20.75	24.32	18.09	30.74	11.42
10,000 to 24,999	21.03	16.98	19.61	33.41	11.27
5,000 to 9,999	26.21	18.30	16.95	49.58	21.31
2,500 to 4,999	43.21	42.53	26.99	56.37	80.21
under 2,500	57.09	36.23	39.27	122.64	56.60

Source: NFPA's Survey of Fire Departments for 1981 U.S. Fire Experience.
There was insufficient data for communities reporting in the Northeast 500,000 or more category

AVERAGE 1981 FIRE EXPERIENCE BY POPULATION OF COMMUNITY

Population of Community*	All Fires	Structure Fires	Civilian Deaths	Civilian Injuries	Property Loss
500,000 to 999,999	8,676	3,407	17.73	136.20	$11,837,600
250,000 to 499,999	4,541	1,464	11.45	53.79	8,495,750
100,000 to 249,999	1,861	710	4.50	27.83	3,232,900
50,000 to 99,999	772	248	1.62	8.84	1,340,700
25,000 to 49,999	384	133	.70	3.55	665,290
10,000 to 24,999	175	66	.33	1.75	395,600
5,000 to 9,999	78	28	.18	.76	268,580
2,500 to 4,999	44	17	.14	.38	127,040
under 2,500	19	7	.07	.22	68,330

Source: NFPA's Survey of Fire Departments for U.S. Fire Experience (1981).
*There was insufficient data for communities reporting in the 1,000,000 or more category.

Multiple-Death Fires

A very small number of fires, those that kill three or more people (multiple-death fires), are probably the most devastating of the millions of fires that occur each year. During the five-year period from 1977 to 1981, there were 1,482 multiple-death fires with 6,305 associated deaths reported to the NFPA (see table).[1] Included in the 1,482 fires are two of the most serious fires in recent U.S. history, the Beverly Hills Supper Club fire in May 1977 and the MGM Grand Hotel fire in November 1980. While these fires received worldwide media attention and shocked the nation, a multiple-death fire of any size usually has a significant impact on a community or region.

One factor that increases the impact of multiple-death fires is that the majority of them occur in homes or other residential properties. From 1977 to 1981, almost 90 percent of the multiple-death fires reported and 85 percent of the associated deaths were in residential properties.

The NFPA has collected information, studied, and reported on multiple-death fires for many years, due to their significant contribution to the United States fire problem. In 1981 for example, multiple-death fires accounted for only .01 percent of an estimated 2,893,500 fires, but 17.4 percent of the 6,700 estimated fire deaths.[2] A reduction in the number of multiple-death fires occurring each year in the United States could have a significant impact on the number of people who annually lose their lives in fires.

MULTIPLE-DEATH FIRES, 1977-1981

Year	*Number of Multiple-Death Fires*	*Number of Deaths in Multiple-Death Fires*	*Fires Causing 10 or More Deaths*	*Deaths in Fires Killing 10 or More*
1981	290	1,168	7	108
1980	326	1,352*	6	168*
1979	282	1,119	8	124
1978	290	1,161	7	95
1977	294	1,505**	8	326**

* Includes 85 deaths in the MGM Grand Hotel fire.

** Includes 165 deaths in the Beverly Hills Supper Club fire.

Note: The information presented in this Table for 1977 to 1980 differs from previously published statistics due to the updating of NFPA data files as additional information becomes available.

Effects of Major Loss of Life Fires 1900-1981

Historically, fires resulting in a major loss of life have resulted in important changes in building and fire codes and standard fire protection or prevention practices.[3,4] In the early 1900s four building fires, the Rhoades Opera House (1903), the Iroquois Theater (1903), the Lakeview Grammar School (1908), and the Triangle Shirtwaist Factory (1911) were largely responsible for the appointment of the NFPA's Committee on Safety to Life in 1913. The chapter "Origin and Development of *101*" in the current *Life Safety Code* (NFPA *101*) states: "For the first few years of its existence, the committee devoted its attention to a study of the notable fires involving loss of life and in analyzing the causes of this loss of life. This work led to the preparation of standards for the construction of stairways, fire escapes, etc., for fire drills in various occupancies and for the construction and arrangement of exit facilities for factories, schools, etc., which form the basis of the present Code."[5]

SELECTED FIRES CAUSING LARGE LOSS OF LIFE — 1900-1982
(10 or more deaths)

Date	Location	Number of Deaths
	PUBLIC ASSEMBLY	
Jan. 12, 1903	Rhoades Opera House, Boyertown, PA	170
Dec. 30, 1903	Iroquois Theater, Chicago, IL	602
Nov. 22, 1919	Dance Hall, Ville Platte, LA	25
Apr. 23, 1940	Rhythm Club, Natchez, MS	207
Nov. 28, 1942	Cocoanut Grove (night club), Boston, MA	492
July 6, 1944	The Ringling Brothers and Barnum and Bailey Circus, Hartford, CT	168
Jan. 29, 1956	Amusement Hall, Arundel Park, MD	11
Oct. 10, 1963	Indiana State Fairgrounds Coliseum, Indianapolis, IN	74
Feb. 7. 1967	Dale's Penthouse (restaurant), Montgomery, AL	25
June 24, 1973	The Upstairs Lounge, New Orleans, LA	32
June 30, 1974	Gulliver's Discotheque, Port Chester, NY	34
Dec. 29, 1975	Airport Terminal building, Brooklyn, NY (bomb explosion)	13
Oct. 24, 1976	The Puerto Rican Social Club, Bronx, NY	25
May 28, 1977	Beverly Hills Supper Club, Southgate, KY	165
Dec. 4, 1980	Conference Center in Stouffer's Inn, Harrison, NY	26
	EDUCATIONAL	
Mar. 4, 1908	Lakeview Grammar School, Collinwood, OH	175
Oct. 28, 1915	St. John's Parochial School, Peabody, MA	22
May 17, 1923	Cleveland School, Beulah, SC	77
Dec. 24, 1924	Babbs Switch School, Hobart, OK	36
Mar. 18, 1937	Consolidated School, New London, TX (gas explosion)	294
Mar. 31, 1954	Cleveland Hill School, Cheektowaga, NY	15
Dec. 1, 1958	Our Lady of the Angels Grade School, Chicago, IL	95
	INSTITUTIONAL	
May 15, 1929	Cleveland Clinic, Cleveland, OH	125
Apr. 21, 1930	Ohio State Penitentiary, Columbus, OH	320
Apr. 4, 1949	St. Anthony Hospital, Effingham, IL	74
Jan. 7, 1950	Mercy Hospital, Davenport, IA	41
Dec. 8, 1961	Hartford Hospital, Hartford, CT	16
Nov. 23, 1963	Golden Age Nursing Home, Fitchville Township, OH	63
Jan. 9, 1970	Convalescent Home, Marietta, OH	32
Jan. 14, 1971	Nursing Home, Buechel, KY	10
Oct. 19, 1971	Nursing Home, Honesdale, PA	15
June 9, 1975	Jail fire, Sanford, FL	11
Jan. 30, 1976	Nursing Home, Chicago, IL	24
June 26, 1977	County Jail, Columbia, TN	42
Dec. 9, 1978	Institution for Mentally Retarded, Ellisville, MS	15
Dec. 27, 1979	County jail, Lancaster, SC	11
Nov. 8, 1982	Jail fire, Biloxi, MS	29
	RESIDENTIAL	
	Apartments	
June 3, 1969	Apartment House, Kansas City, MO	12
Aug. 5, 1970	Apartment Building, Minneapolis, MN	12
Apr. 25, 1971	Apartment Building, Seattle, WA	12
Nov. 30, 1972	High Rise Housing for the Elderly, Atlanta, GA	10
Nov. 15, 1973	Apartment House, Los Angeles, CA	25
Dec. 12, 1975	Apartment Building, San Francisco, CA	14
Feb. 4, 1976	Tenement house, New York, NY	10

SELECTED FIRES CAUSING LARGE LOSS OF LIFE — 1900-1982
(10 or more deaths)

Date	Location	Number of Deaths
Dec. 20, 1976	Apartment house, Los Angeles, CA	10
Dec. 23, 1976	Apartment house, Chicago, IL	12
Dec. 7, 1978	Apartment House, Newark, NJ	12
Jan. 20, 1979	Tenement, Hoboken, NJ	21
Oct. 28, 1980	Apartment House, Chicago, IL	10
Dec. 18, 1980	Apartment House, Salt Lake City, UT	12
Oct. 24, 1981	Apartment House, Hoboken, NJ	11
	Dwellings	
June 8, 1969	Dwelling, Parkersburg, WV	12
Jan. 11, 1981	Dwelling, East St. Louis, IL	11
May 14, 1982	Dwelling, Baltimore, MD	10
	Other Residential	
Dec. 13, 1977	Dormitory, Providence College, Providence, RI	10
	HOTELS	
	The hotel category includes residential (home) hotels in addition to hotels usually frequented by the traveling public.	
June 5, 1946	The LaSalle Hotel, Chicago, IL	61
Dec. 7, 1946	Winecoff Hotel, Atlanta, GA	119
June 9, 1946	Canfield Hotel, Dubuque, IA	19
Dec. 29, 1963	Roosevelt Hotel, Jacksonville, FL	22
Mar. 20, 1970	Ozark Hotel, Seattle, WA	20
Sept. 13, 1970	Ponet Square Hotel, Los Angeles, CA	19
Dec. 20, 1970	Pioneer Hotel, Tucson, AZ	28
Jan. 16, 1972	Pennsylvania House Hotel, Tyrone, PA	12
Aug. 25, 1974	Washington House Hotel, Berkeley Springs, WV	12
July 7, 1975	Pomona Hotel, Portland, OR	11
Jan. 10, 1976	Pathfinder Hotel, Fremont, NE	20
Jan. 28, 1977	Stratford Hotel, Breckenridge, NM	17
Dec. 10, 1977	Resort Hotel, Bay City, MI	10
Jan. 28, 1978	Coates House Hotel, Kansas City, MO	20
Nov. 5, 1978	Allen Motor Inn, Honesdale, PA	12
Nov. 26, 1978	Holiday Inn, Greece, NY	10
July 31, 1979	Holiday Inn, Cambridge, OH	10
Nov. 21, 1980	MGM Grand Hotel, Las Vegas, NV	85
Mar. 14, 1981	Royal Beach Hotel, Chicago, IL	19
Mar. 6, 1982	Westchase Hilton Hotel, Houston, TX	12
Apr. 30, 1982	Pinter's Home Hotel, Hoboken, NJ	13
Sept. 4, 1982	Dorothy Mae Hotel, Los Angeles, CA	24
	BOARDING FACILITIES/HALFWAY HOUSES	
Apr. 1, 1979	Boarding Home, Connellsville, PA	10
Apr. 2, 1979	Boarding Home, Farmington, MO	25
Apr. 11, 1979	Halfway House, Washington, DC	10
Nov. 11, 1979	Boarding Home, Pioneer, OH	14
July 26, 1980	Boarding Home, Bradley Beach, NJ	24
Jan. 9, 1981	Boarding Facility, Keansburg, NJ	31

Date	Location	Number of Deaths
	STORE AND OFFICE	
July 28, 1945	Empire State Building, New York, NY	14
Aug. 10, 1955	Dairy Store, Andover, OH	22
Nov. 17, 1966	Mercantile Building, New York, NY	12
Apr. 5, 1968	Marting Arms (sporting goods store), Richmond, IN	41
Feb. 25, 1969	Office Building, New York, NY	11
Sept. 24, 1972	Ice Cream Parlor, Sacramento, CA	22
Feb. 2, 1973	Department Store, Eagle Grove, IA (natural gas explosion)	14
Dec. 22, 1976	Department Store, Brooklyn, NY	12
Nov. 5, 1978	Department Store, Des Moines, IA	10
	BASIC INDUSTRY, UTILITY, DEFENSE	
Mar. 25, 1947	Centralia Coal Co., Centralia, IL	111
Dec. 21, 1951	C.W. & F. Coal Company, W. Frankfort, IL	119
Aug. 9, 1965	Missile Silo, Near Searcy, AR	53
Dec. 30, 1970	Coal Mine Explosion, Hyden, KY	38
May 2, 1972	Silver Mine, Kellogg, ID	91
Mar. 9 & 11, 1976	Coal Mine Explosion, Oven Fork, KY (two blasts)	26
Dec. 8, 1981	Coal Mine, Whitwell, TN	13
	MANUFACTURING	
Nov. 26, 1910	Factory Building, Newark, NJ	25
Dec. 22, 1910	Nelson Morris Co., Chicago, IL	21
Mar. 25, 1911	Triangle Shirtwaist Co., New York, NY	145
July 22, 1913	Binghamton Clothing Co., Binghamton, NY	35
April 10, 1917	Eddystone Ammunition Corp., Eddystone, PA (explosion)	133
July 29, 1956	Refinery, Sun Ray, TX	19
Jan. 24, 1957	Clothing Factory, New Haven, CT	15
Mar. 19, 1958	Clothing Factory, New York, NY	24
Oct. 4, 1960	Aniline MFG Plant, Kingsport, TN	15
Jan. 2, 1963	Meat Processing Plant, Terre Haute, IN	16
Aug. 25, 1965	Synthetic Rubber MFG, Louisville, KY	12
Feb. 3, 1971	Chemical Plant, Woodbine, GA (violent explosion and fire)	25
Dec. 16, 1972	Steel Plant, Weirton, WV (gas explosion in a coke oven)	21
Aug. 12, 1976	Oil Refinery Explosion, Chalmette, LA	12
July 24, 1980	Metal Products MFG, New York, NY	11
	STORAGE	
July 17, 1944	Munitions Depot, Port Chicago, CA (explosion)	300
Oct. 20, 1944	East Ohio Gas Co., Cleveland, OH (gas explosion)	136
May 19, 1950	Pier (R.R.) South Amboy, NJ	31
Dec. 22, 1977	Grain elevator explosion, Westwego, LA	36
Dec. 27, 1977	Grain elevator explosion, Galveston, TX	18
	SPECIAL	
	Under Construction/Unoccupied	
June 24, 1971	Water Project, Sylmar, CA	17
Dec. 11, 1971	Water Tunnel, Port Huron, MI	22
Feb. 10, 1973	LNG Storage Tank, Staten Island, NY	40
	Outdoor Properties	
Oct. 12, 1918	Forest Fire, Minnesota	559
Oct. 3, 1933	Forest Fire, Los Angeles, CA	28
Oct. 23, 1947	Forest Fire, Maine	15

SELECTED FIRES CAUSING LARGE LOSS OF LIFE — 1900-1982
(10 or more deaths)

Date	Location	Number of Deaths
Aug. 7, 1948	Forest Fire, Helena, MT	13
July 9, 1953	Forest Fire, Alder Springs, CA	15
Nov. 1, 2, 1966	Forest Fires, Southern CA	18
	Water Transportation	
June 30, 1900	Steamship, Hoboken, NJ	326
June 15, 1904	Excursion Steamer, General Slocum, Hells Gate Passage, East River, New York, NY	1030
Sept. 8, 1934	S.S. Morro Castle, off the New Jersey Coast	125
Apr. 16, 1947	S.S. Grandcamp, Texas City, TX	468
Sept. 9, 1947	Queen Island, Passenger Vessel, Pittsburgh, PA	21
Jan. 17, 1956	S.S. Salem Maritime, Tank Ship, Lake Charles, LA	21
Dec. 19, 1960	U.S.S. Constellation, New York, NY	50
June 6, 1966	Ship Collision, New York, NY	37
Apr. 6, 1969	S.S. Union Faith, Mississippi River at New Orleans, LA	25
Feb. 1, 1972	S.S. V.A. Fogg, Tank Ship, Galveston, TX	39
Apr. 9, 1974	S.S. Elais, Tanker, Tinicum Township, PA	11
Jan. 31, 1975	Ship Collision, Marcus Hook, PA	29
Nov. 5, 1979	Ship Collision, Galveston, TX	32
	Rail Transportation	
Sept. 27, 1915	Tank Car, Ardmore, OK	43
July 31, 1940	Train Collision, Cuyahoga Falls, OH	43
May 25, 1950	Street Car-Tank Truck Collision, Chicago, IL	34
June 28, 1959	Tank Car Derailment, Meldrim, GA	23
Mar. 1, 1960	Train-Tank Truck Collision, Bakersfield, CA	14
Dec. 28, 1966	Passenger Train-Tank Truck, Collision, Everett, MA	13
July 5, 1973	Tank Car, Kingman, AZ	13
Feb. 24, 1978	Derailment, Waverly, TN	16
	Highway Transportation	
Jan. 31, 1936	Prision Transport Van, Scottsboro, LA	20
Mar. 24, 1937	Bus Accident, Salem, IL	20
Aug. 4, 1952	Bus Accident, Waco, TX	28
Mar. 7, 1968	Bus-Auto Accident, Baker, CA	21
Apr. 30, 1975	LP Gas Tank Truck, Eagle Pass, TX	19
June 26, 1981	Converted Bus, San Bernardino, CA	10
	Air Transportation (fire deaths only)	
May 6, 1937	Zeppelin, Lakehurst, NJ	36
Mar. 20, 1969	DC-3, Kenner, LA	16
Nov. 28, 1970	DC-8, Anchorage, AK	47
Dec. 8, 1972	Aircraft Crash, Chicago, IL	45
Dec. 20, 1972	DC-9 Crash, Chicago, IL	10
Apr. 4, 1977	DC-9 Crash, New Hope, GA	28

In 1930, the fire on board the *S.S. Morro Castle* off the New Jersey coast resulted in international regulations on firesafety for vessels (see "Famous Fires in History").

The 1937 fire at the Consolidated School in New London, Texas tragically pointed out the need for state laws to protect public buildings not subject to municipal ordinance and inspection. Then in the 1940s, a series of multiple-death fires, including The Rhythm Club, The Cocoanut Grove, and fires in The La Salle, Canfield, and Winecoff Hotels, focused national attention upon the need for adequate exits and other firesafety features in hotels and public buildings. These fires resulted in major changes to the "Building Exits Code" over a period of almost two decades. The standard for *Assembly Seating, Tents, and Air-supported Structures* (NFPA 102) was the result of still another multiple-death fire of the 1940s — the 1944 Hartford Circus Tent fire in which 168 people were killed.

Two hospital fires, St. Anthony's in Effingham, Illinois in 1949 and the Hartford Hospital in 1961 moved hospital administrators and fire prevention officials across the nation to assess the quality of construction and fire protection systems in hospitals.

The Our Lady of Angels School fire in Chicago on December 1, 1958 probably resulted in the swiftest action in the wake of any recent major fire since World War II. Within days of the fire, state and local officials throughout the nation ordered fire inspections of schools and within one year it was reported that major improvements in life safety were made in 16,500 schools across the country. Improvements in the frequency and quality of exit drills, inspections, the storage of combustible supplies, and the disposal of waste materials were also reported in almost every community where schools were surveyed.[6]

The effects of more recent fires such as The Beverly Hills Supper Club, The MGM Grand Hotel, and others are still being felt in the fire protection community.

The multiple-death fire record in nursing homes is one of the most striking examples of the response of government and the fire protection community to a serious problem. During the 1960s, there were 28 multiple-death fire incidents resulting in 211 deaths in nursing homes reported to the NFPA. This record appeared to be destined to repeat itself in the early 1970s. Between 1970 and 1976, there were 125 deaths in 13 multiple-death incidents. However, since 1977 there have been no multiple-deaths in nursing home fires reported to the NFPA. Two code-related reasons have been given for this rather dramatic turnaround: (1) the increase in use of model building codes by state and local governments during the late 1960s and early 1970s, and (2) the significant decision by the Department of Health, Education and Welfare (now known as the Department of Health and Human Services), to enforce the NFPA's *Life Safety Code* in all nursing homes receiving federal funds.

The enforcement of these codes in nursing homes, in many cases retroactively, has resulted in improvements in the protection of vertical openings, interior finish, means of egress, compartmentalization, staff training, installation of fixed detection and alarm systems, and in many cases fixed suppression systems such as automatic sprinklers. These are the protection features fire investigators have been recommending for many years to improve life safety in buildings.

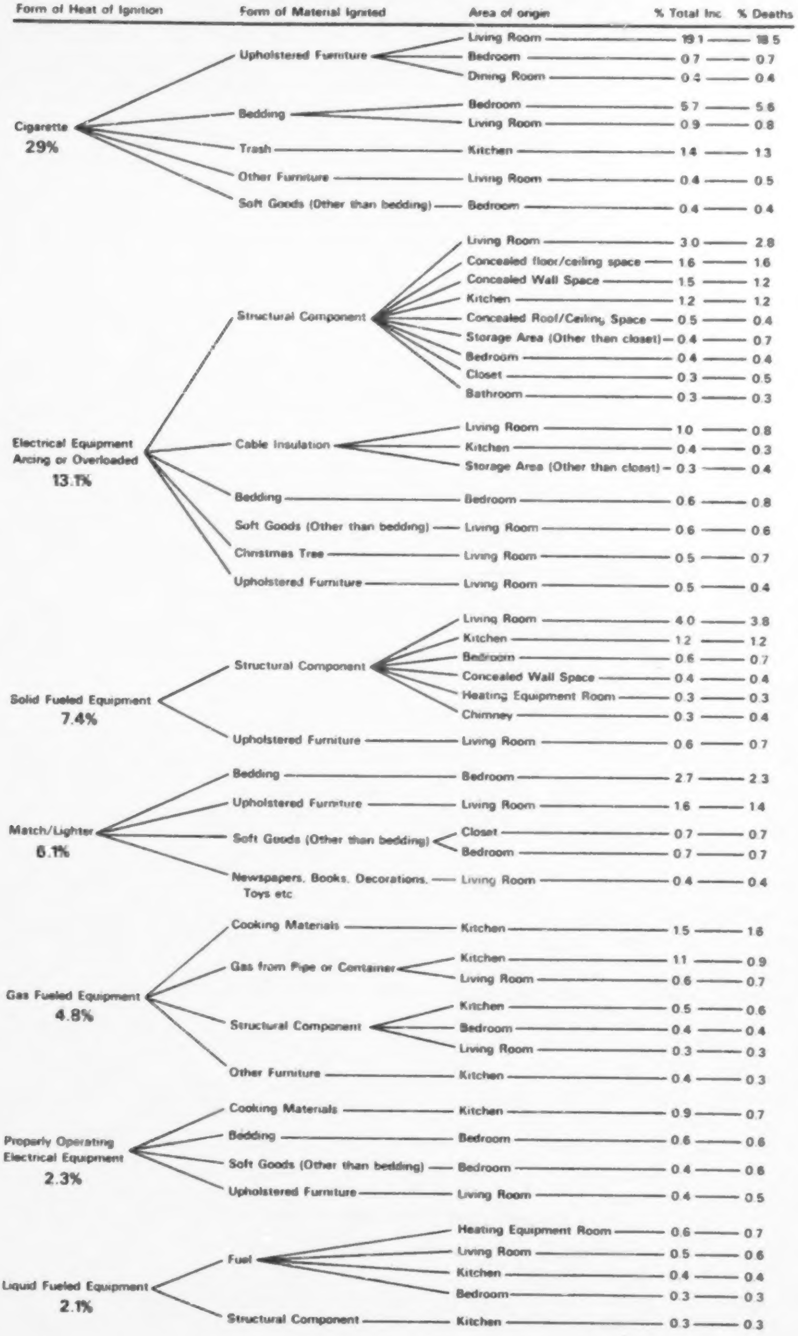
Another important lesson learned from the NFPA's fire experience records is the effectiveness of automatic sprinklers in preventing major loss of life fires. The NFPA has no record of a multiple-death fire in a completely sprinklered building where the system was properly operating, except where an explosion or flash fire killed or fatally injured the victims prior to operation of the system or where the victims were involved in fire fighting.

Multiple-Death Fires in Residential Properties

As previously discussed, most fire-related multiple deaths in the United States occur in residential properties. This section will discuss the leading accidental ignition scenarios of residential multiple-death fires, who dies in these fires, and strategies to prevent them.

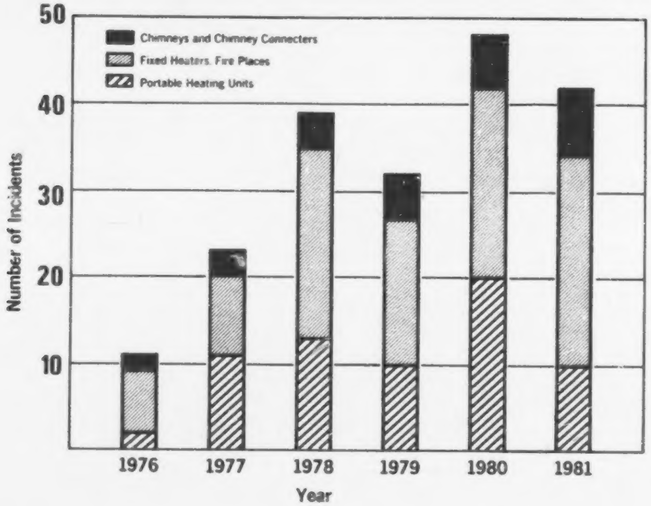
The table accompanying this section presents the leading ignition scenarios for accidental multiple-death fires in residential properties for the period from 1971 to 1981. This table is based upon a study of 941 fires with 3,651 associated deaths. As in other similar studies of fatal fires,[7,8] cigarettes continue to be the leading cause of residential multiple-death fires, accounting for 29 percent of the fires studied. Electrical malfunctions

Accidental Ignition Scenarios for Multiple-Death Fires in Residential Properties (1971 to 1981)

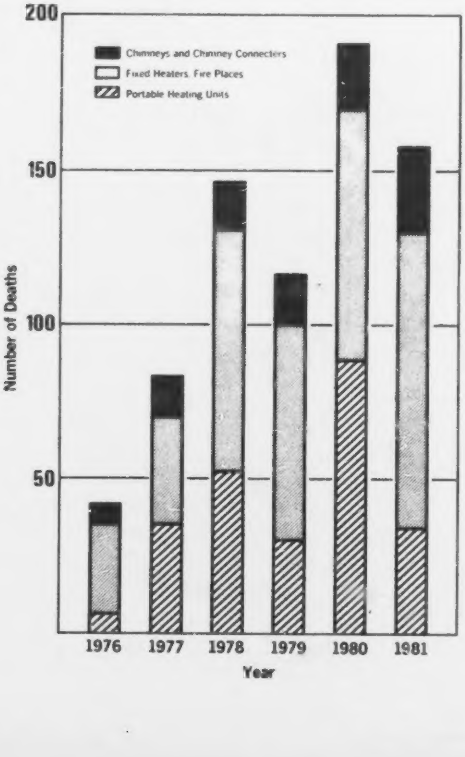


Form of Heat of Ignition	Form of Material Ignited	Area of origin	% Total Inc.	% Deaths
Cigarette 29%	Upholstered Furniture	Living Room	19.1	18.5
		Bedroom	0.7	0.7
		Dining Room	0.4	0.4
	Bedding	Bedroom	5.7	5.6
		Living Room	0.9	0.8
	Trash	Kitchen	1.4	1.3
	Other Furniture	Living Room	0.4	0.5
	Soft Goods (Other than bedding)	Bedroom	0.4	0.4
Electrical Equipment Arcing or Overloaded 13.1%	Structural Component	Living Room	3.0	2.8
		Concealed floor/ceiling space	1.6	1.6
		Concealed Wall Space	1.5	1.2
		Kitchen	1.2	1.2
		Concealed Roof/Ceiling Space	0.5	0.4
		Storage Area (Other than closet)	0.4	0.7
		Bedroom	0.4	0.4
		Closet	0.3	0.5
		Bathroom	0.3	0.3
	Cable Insulation	Living Room	1.0	0.8
		Kitchen	0.4	0.3
		Storage Area (Other than closet)	0.3	0.4
	Bedding	Bedroom	0.6	0.8
	Soft Goods (Other than bedding)	Living Room	0.6	0.6
	Christmas Tree	Living Room	0.5	0.7
	Upholstered Furniture	Living Room	0.5	0.4
Solid Fueled Equipment 7.4%	Structural Component	Living Room	4.0	3.8
		Kitchen	1.2	1.2
		Bedroom	0.6	0.7
		Concealed Wall Space	0.4	0.4
		Heating Equipment Room	0.3	0.3
		Chimney	0.3	0.4
	Upholstered Furniture	Living Room	0.6	0.7
Match/Lighter 6.1%	Bedding	Bedroom	2.7	2.3
	Upholstered Furniture	Living Room	1.6	1.4
	Soft Goods (Other than bedding)	Closet	0.7	0.7
		Bedroom	0.7	0.7
	Newspapers, Books, Decorations, Toys etc	Living Room	0.4	0.4
Gas Fueled Equipment 4.8%	Cooking Materials	Kitchen	1.5	1.6
	Gas from Pipe or Container	Kitchen	1.1	0.9
		Living Room	0.6	0.7
	Structural Component	Kitchen	0.5	0.6
		Bedroom	0.4	0.4
		Living Room	0.3	0.3
	Other Furniture	Kitchen	0.4	0.3
Properly Operating Electrical Equipment 2.3%	Cooking Materials	Kitchen	0.9	0.7
	Bedding	Bedroom	0.6	0.6
	Soft Goods (Other than bedding)	Bedroom	0.4	0.6
	Upholstered Furniture	Living Room	0.4	0.5
Liquid Fueled Equipment 2.1%	Fuel	Heating Equipment Room	0.6	0.7
		Living Room	0.5	0.6
		Kitchen	0.4	0.4
		Bedroom	0.3	0.3
	Structural Component	Kitchen	0.3	0.3

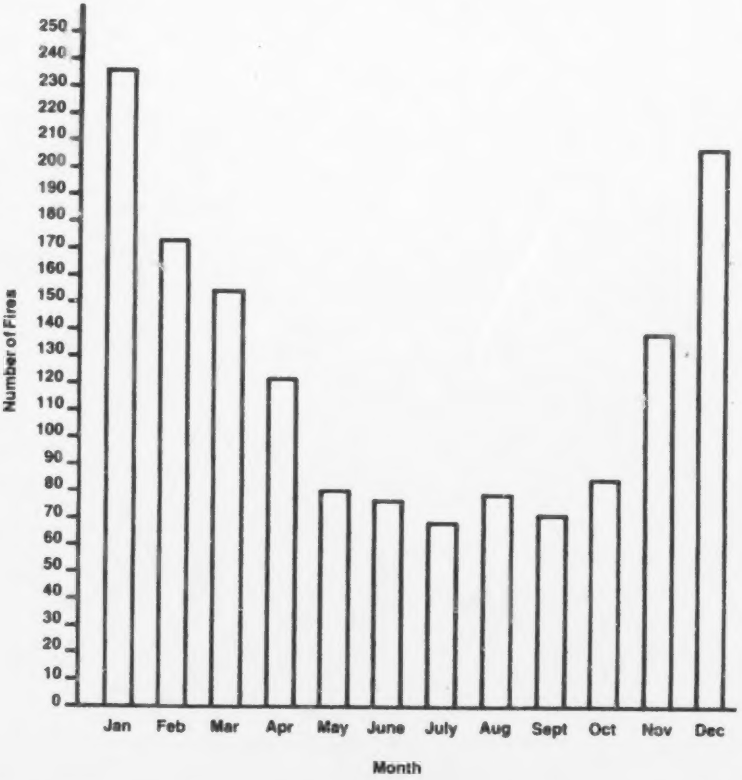
Auxiliary Heating Related Multiple Death Fires
in Dwellings and Apartments. 1976-1981



Auxiliary Heating Related Deaths in Multiple Death Fires
in Dwellings and Apartments, 1976 to 1981

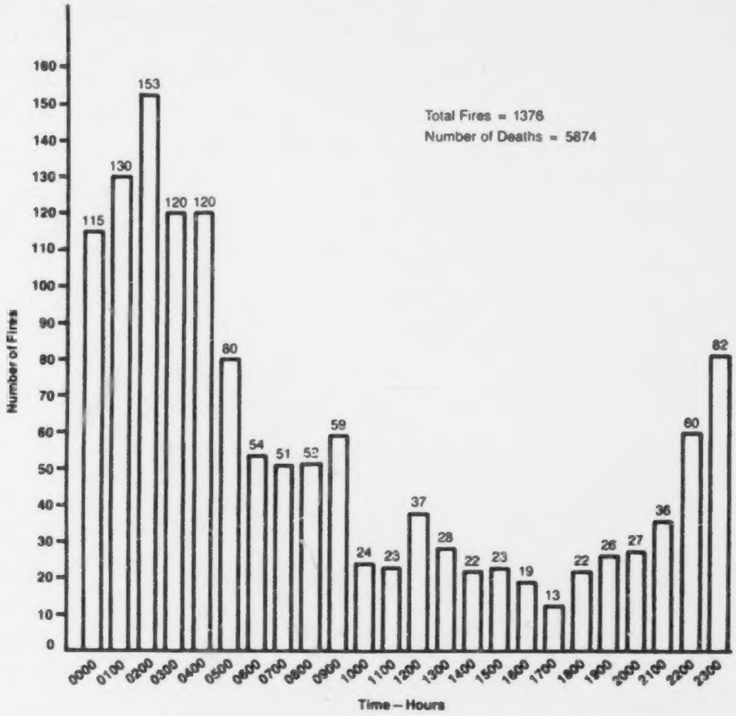


or overloaded circuitry follow, with over 13 percent. Fires resulting from matches or lighters presented in this table would be primarily those that result from children playing and improper disposal, etc.; they are not incendiary in origin. Four of the last five forms of heat of ignition are involved with heating or cooking. These scenarios and the information presented in the two bar graphs show the impact of the use of alternative heating devices in private homes. This fire experience and the knowledge that millions of woodstoves, and portable electric and kerosene heaters have been sold in the U.S. during the last several years lead to the conclusion that heating-related fires will continue to kill hundreds of people each year. This conclusion is supported by data that show a sharp increase in incidents during the months from November to April, a time when some form of heating device is required in large areas of the U.S. (see graph).

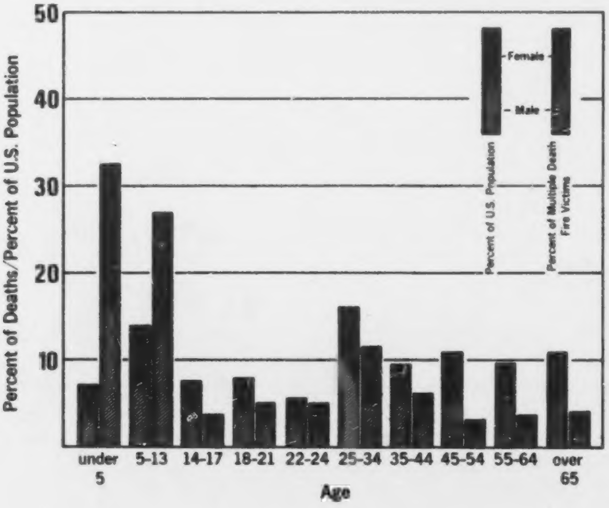


A study of the time of alarm for multiple-death fires from 1977 to 1981 is shown in the graph below. Almost 75 percent of the fires studied occurred between the hours of 8:00 p.m. and 8:00 a.m., the time when most people are in their homes and asleep.

A study of the age and sex of multiple-death fire victims for 1981 is also shown below, and displays the very large percentage of multiple-death fire victims who are children. In 1981, over 59 percent of the multiple-death fire victims were under the age of 14. It appears that many of the victims are incapable of escape due to their age or lack of knowledge of what to do in the event of a fire.



1981 Residential Multiple Death Fires, Ages of Victims by Sex Compared to Ages in the General Population



As a result of the NFPA's continued study of residential multiple-death fire experience, several strategies can be presented to help reduce the loss of life in these fires.

1. *The installation and proper maintenance of smoke detectors in individual households.*[9]
   Based upon the study of the many factors that contributed to the large loss of life in a fire, this one precaution could have a significant impact.
2. *Encourage families to plan and practice a home escape plan.*
   When used with smoke detectors, this strategy will provide the most cost effective, easily implemented, and effective life saving protection available today.[10]
3. *Establish public firesafety education as a priority within the fire protection community.*
   People must be taught to protect themselves, their families, and friends from fire. This should include public campaigns to accomplish strategies 1 and 2 above, and to teach the safe use and installation of alternative heating devices, the proper storage and handling of flammable liquids, and the identification and correction of home fire hazards. Examples of lives saved as a result of ongoing public education programs are numerous.
4. *Remove the cigarette from the ignition sequence.*
   In recent years, there has been much discussion regarding changing the properties of cigarettes to make them more firesafe. It is important that fire protection leaders continue to press for such change as soon as possible. While other work with long-range impact is currently being done, such as improvements in the fire resistance of upholstered furniture, the impact of more firesafe cigarettes would be immediate and long lasting.
5. *Continue to research and develop methods to implement the use of residential sprinkler systems.*[11]
   Recent research has proven that residential sprinkler systems using specially designed fast-acting heads and domestic water pipe are both economical and effective. Further research has also shown the effectiveness of similar technology to protect existing hotels and motels. Several communities in the country have begun to require such systems in new homes, primarily in response to staff reductions on fire departments. The research and subsequent standard covering residential sprinkler systems (NFPA 13D, *Sprinkler Systems for One- and Two-Family Dwellings-1980*) relied upon common ignition scenarios developed in the study of multiple-death fires. When such systems are in common use, they will provide a very high level of protection to the occupants of dwellings. A reduction in the number of lives lost in residential fires should follow the increased use of residential sprinklers.

References

[1] Jon C. Jones, "1981 Multiple-Death Fires In The United States," *Fire Journal*, Vol. 76, No. 4 (July 1982), p. 68.

[2] Michael J. Karter, Jr., "Fire Loss In The United States During 1981," *Fire Journal*, Vol. 76, No. 5 (September 1982), p. 68.

[3] Percy Bugbee, *Principles of Fire Protection*, (Boston: National Fire Protection Association), 1978, p. 13.

[4] Paul R. Lyons, *Fire In America!*, (Boston: National Fire Protection Association), 1976.

[5] NFPA *101, Life Safety Code* - 1981, p. ix.

[6] Paul E. Teague, "Our Schools: How Safe Are They?," *Fire Journal*, Vol. 72, No. 6 (November 1978), p. 21.

[7] Walter G. Berl and Byron M. Halpin, "Human Fatalities From Unwanted Fires," *Fire Journal*, Vol. 73, No. 5 (September 1979), p. 105.

[8]Dr. Louis Derry, "Fatal Fires In America: How They Happen, Where They Happen, How To Stop Them," *Fire Journal*, Vol. 73, No. 5 (September 1979), p. 67.

[9]See NFPA 74, *Household Fire Warning Equipment-1980*.

[10]Such as Operation EDITH (Exit Drills In The Home) as supported by the NFPA and the Fire Marshals Association of North America.

[11]See NFPA 13D, *Sprinkler Systems for One- and Two-Family Dwellings-1980*.

Ignition Scenarios of One- and Two-Fatality Fires and Profiles of Fire Victims

Ignition Scenarios of One- and Two-Fatality Fires

In a September 1979 Fire Journal *article, "Fatal Fires in America," Dr. Louis Derry examined the ignition scenarios of fires that resulted in one or two fatalities (82 percent of all fire deaths are concentrated in such fires). The results and discussion presented here are based on that article.*

Introduction

A fire scenario is a chain of events bringing together a source of heat and a combustible material under conditions suitable for ignition. Break the scenario by eliminating or modifying the heat, the material, or the circumstance uniting these, and the fire will not occur. Review of fatal fire reports soon leads to the conclusion that a small number of scenarios recur in the ignition of fires and lead to many fire deaths. If these ignition scenarios can be identified in detail and possibly broken, the savings in lives could be substantial.

For example, in the most common types of one- and two-fatality fires (32 percent) cigarettes ignite either upholstered furniture in living areas or bedding in sleeping areas. Engineer a cigarette that is less likely to ignite upholstery and bedding, engineer the upholstery and bedding to better resist ignition, or educate and motivate the smoker to be more careful, and these two deadly chains leading to 32 percent of the deaths in one- and two-fatality fires are broken.

Ignition Scenarios

The leading ignition scenarios for one- and two-fatality fires are shown in the table below. These scenarios account for over 50 percent of the deaths.

Highlights of this ranking are:

Cigarettes: The top two scenarios account for 32 percent of the national deaths in one- and two-fatality fires. In these scenarios, cigarettes ignite, respectively, upholstered furniture in living areas and bedding in sleeping areas. In all, cigarettes are responsible for ignition in 5 of the top 18 scenarios.

Motor Vehicle Crashes: The third and tenth ranking scenarios involve the ignition of fuel in vehicle crashes.

Clothing Ignition: In 3 of the leading scenarios, clothing on a person is ignited.

Heating and Cooking Equipment: This equipment provides the heat of ignition in 6 of the top scenarios.

Residential Areas of Origin: Residential areas dominate the scenario list: living area, sleeping area, kitchen.

Fire station towers were constructed, not as watchposts, but as places to hang up fire hoses for draining and drying.

Leading Ignition Scenarios for One- and Two-Fatality United States Fires, 1971-1978

Both Accidental and Incendiary and Suspicious Fires Are Included

(Out of 780 distinct scenarios, 52.6 percent of the deaths were concentrated in the 18 scenarios listed below)

Heat of Ignition	Material Ignited	Area of Origin	Percent of Deaths	Percent of Fires
Cigarette	Upholstered furniture	Living area	17.3	16.9
Cigarette	Bedding	Sleeping area	14.7	15.5
Highway motor vehicle crash	Fuel	Vehicle fuel tank	3.9	3.7
Match, lighter, candle	Bedding	Sleeping area	2.3	2.2
Heating, cooking equipment	Structural component	Living area	1.7	1.5
Cooking equipment	Clothes on a person	Kitchen	1.5	1.8
Cooking equipment	Cooking materials	Kitchen	1.4	1.6
Cigarette	Upholstered furniture	Sleeping area	1.4	1.4
Heating, cooking equipment	Fuel	Kitchen	1.2	1.3
Highway motor vehicle crash	Gasoline, LP-Gas	Truck cargo area	1.1	1.1*
Cigarette	Bedding	Living area	0.9	0.9
Heating, cooking equipment	Fuel	Living area	0.8	0.9
Match, lighter, candle	Upholstered furniture	Living area	0.8	0.7
Match, lighter, candle	Soft goods other than bedding or clothes on a person	Sleeping area	0.8	0.7
Match, lighter, candle	Clothes on a person	Sleeping area	0.7	0.8
Cigarette	Clothes on a person	Sleeping area	0.7	0.8
Heating equipment	Fuel	Heating equipment area	0.7	0.7
Match, lighter, candle	Fuel	Living area	0.7	0.6

Based on 5,405 civilian deaths in 4,493 one- and two-fatality fires with known ignition scenarios in the NFPA FIDO data.

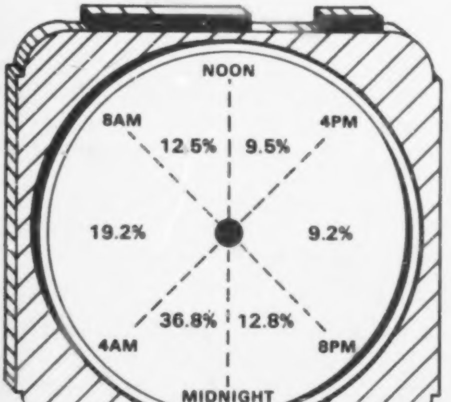
All percents in this Table refer to this data set.

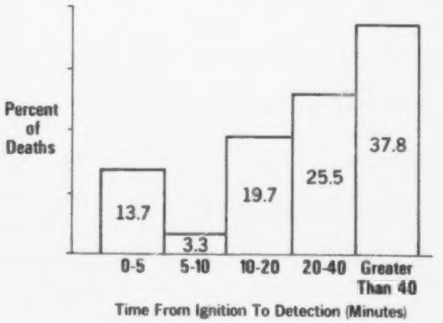
Out of 780 distinct scenarios in this data set, the 18 scenarios in this Table accounted for 52.6 percent of the deaths and 53.1 percent of the fires.

*The fires in this scenario are generally dramatic and are particularly well reported. For this reason, it is possible that the scenario is over-represented in the data. Further research will clarify this question.

Residential One- and Two-Fatality Fires by Time of Alarm and Time from Ignition to Detection

Over two-thirds of the 7,288 deaths reported and shown in the first graph below occurred between the hours of 8 pm and 8 am in fires that ignited and developed at night, trapping sleeping occupants. In residential one- and two-fatality fires, many of the deaths occurred when fire had a large headstart — over 40 minutes before discovery for 38





percent of the deaths. This means that in many instances, fires are not discovered in time for residents to escape or that the fire department did not have sufficient time to respond and rescue the occupants.

Preventing Fire Deaths

The fire death problem in all of its aspects is very complex, and comprehensive solutions must be equally complex. As we saw earlier, a small number of fatal ignition scenarios occur frequently and comprise the majority of total fire deaths.

The interventions discussed here are aimed at the key features of the fire death problem and offer the promise of saving a large number of lives.

Break the Ignition Chain:

- *Manage the Heat of Ignition*: Two principal approaches are to influence users to handle potential ignition sources more carefully and to engineer these sources to be less hazardous. Through its Learn Not To Burn Program media efforts, the NFPA promotes firesafe behavior for both children and adults using television, radio, and print messages. The NFPA Learn Not To Burn Curriculum is available for adoption by schools to use in teaching children firesafety.

  The cigarette is by far the most common heat of ignition in fatal fires. Recognizing this, the NFPA has endorsed efforts to develop and market more firesafe cigarettes. If such cigarettes should come into general use, the most common fatal fire ignition scenarios will be broken, and the resulting savings in lives could be dramatic and quickly realized.

  Electrical equipment and heating and cooking equipment contribute prominently to the fatal scenarios. The proper installation, maintenance, and use of such equipment will break many of these scenarios.

- *Manage the Material Ignited*: Reduction in the flammability of clothing and household furnishings will break many of the one- and two-fatality fire scenarios.

  The United States Consumer Product Safety Commission has issued flammability standards for children's sleepwear and mattresses, and has considered a standard for upholstered furniture. In the case of furnishings, the firesafety benefits are realized only in the long term, since such consumer items are generally in use for many years before being replaced. The Commission has no jurisdiction to regulate cigarettes, which commonly ignite these items.

  Fuel tanks ruptured in crashes of highway vehicles release flammable liquids that usually become the material first ignited in crash-related fires. The integrity of motor vehicle fuel systems is regulated by Federal Motor Vehicle Safety Standard 301-75. It will be some years yet before all vehicles in use comply with the current version of this Standard. Preliminary studies indicate the Standard has been effective in preserving the integrity of fuel systems during vehicle crashes; the evaluation of the Standard will be more complete when more data becomes available in the next few years. Also, the numbers of deaths in the vehicle crash and burn scenario will be influenced by number of miles driven and average speeds, both of which are sensitive to fuel supplies.

Detect the Fire Promptly:

- Smoke alarms are now widely available at low cost and effectively give early warning of a developing fire, so that evacuation, containment, and suppression can be initiated during the incipient stage of a fire. Such protection is especially appropriate to combat fatal residential fires that commonly claim sleeping victims at night.

  It is essential that such devices be properly installed and maintained, as recommended for one- and two-family dwellings in NFPA 74-1980, *Standard for the Installation, Maintenance, and Use of Household Fire Warning Equipment.*[1]

- An escape plan should be developed for use upon detection of a fire. In the case of residential fires, the NFPA, together with the Fire Marshals Association of North America, sponsors Operation EDITH (Exit Drills In The Home), which provides

1982 HOUSEHOLD SURVEY OF DETECTOR OWNER/NON-OWNER*

	Owners	Non-owners	Total
Total	67%	33%	100%
Ethnicity of head of household			
White	69%	31%	100%
Non-white	53%	47%	100%
Annual household income			
<$7,500	55%	45%	100%
$7,500-15k	63%	37%	100%
$15k-25k	64%	36%	100%
>$25k	75%	25%	100%
Highest level of education of head of house			
Less than high school	61%	39%	100%
Trade-high school graduate	67%	33%	100%
Some college	66%	34%	100%
College graduate	71%	29%	100%

Source: *Residential Smoke and Fire Detector Coverage in the United States: Findings from a 1982 Survey.* Prepared by Market Facts, Inc. for FEMA under FEMA contract number EMW-C-0638, September 1982.

***Data has been weighted by household size.**

evacuation guidelines. The Learn Not To Burn Curriculum also provides information to school children on escape planning.[2]

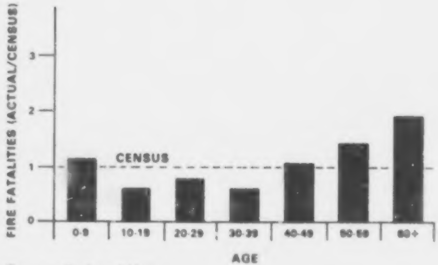
Smoke alarms in combination with escape plans, provide effective protection against deaths resulting from fires in a wide range of ignition scenarios.[3] A demographic study of the type of person who is apt to own a smoke detector was conducted for FEMA in 1982. According to FEMA, the study found that income is a significant factor in predicting whether a household has a smoke detector installed or not.[4] The study also found that only 55 percent of the families with income under $7,500 owned smoke detectors. For households with incomes between $7,500 to $25,000, 64 percent owned detectors while 75 percent of the households with incomes over $25,000 owned detectors. Fifty-three percent of the non-white population owned smoke detectors while 69 percent of the white population owned detectors. The study found some correlation between education and detector ownership; about 61 percent of the households where husband and wife each had less than a high school education owned smoke detectors, while 71 percent of the households where husbands and wife each had education beyond a college degree owned detectors. FEMA contends, and the NFPA agrees, that no matter which category one belongs to, having a smoke detector in the home is a major step in improving firesafety.

Limit Fire Growth by Automatic Suppression:

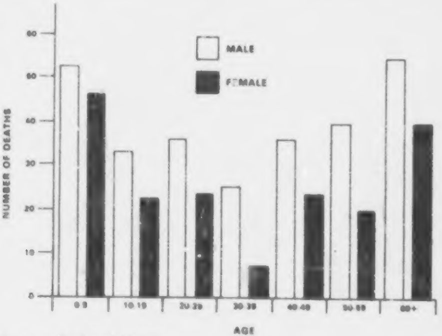
- Current research has shown that quick response residential sprinklers can be very effective for extinguishing or containing fast developing residential fires.[5] Recommendations for residential sprinklers are presented in NFPA 13D-1980, *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Mobile Homes.*

Profile of Fatal Fire Victims

Berl and Halpin researched 463 fire fatalities that occurred from 1972 to 1977 in Maryland.[6] Their study has contributed substantially to the understanding of the demographic characteristics of fire casualties and the physical and biochemical reasons for these deaths.



Source Berl and Halpin



Source Berl and Halpin

Fire Fatalities by Age and Sex

The study found that a disproportionate number of fire deaths occurred among the very young and the elderly — nearly 22 percent occurred in those aged 9 years or less and 20 percent in those 60 years or more. Other studies as well show the same trend of a disproportionate number of fire deaths among the very young and the elderly when compared with their proportion in the U.S. population. This phenomenon can be partially explained by the inability of these individuals to successfully escape from the fire scene and their low tolerance to toxic gases and other combustion products.

The research indicated that the number of male fire deaths overall was about 1½ times the number of female fire deaths. Data reported from 1978 by the U.S. Fire Administration showed similar results. Nationwide, the fire death rate of males (41.0 deaths per million people) was nearly twice the rate of females (23.0). Berl and Halpin noted that greater alcohol use among men, especially those over 20 years of age, played a significant role in the higher number of fire deaths among males.

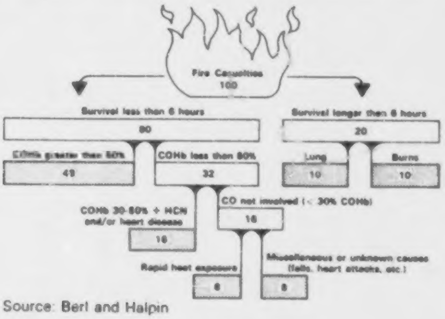
Fire Fatalities by Age and Blood Alcohol Level

When 454 fire victims were examined for blood alcohol level (BAL), 35 percent had BAL in excess of 0.1 percent (the legal definition of drunkenness in Maryland). Over two-thirds of the heavily intoxicated victims were men. With substantial alcohol ingestion, the ability to act quickly, decisively, and correctly in response to fire is inhibited, increasing the chances of a fatal outcome.

Distribution of Fire Fatalities by Age and Blood Alcohol Level (BAL) in Maryland

AGE	0		.01-.09		≥.10	
	No.	Percent	No.	Percent	No.	Percent
0-9	98	100	0	0	0	0
10-19	44	77.2	7	12.3	6	10.5
20-29	39	62.9	5	8.0	18	29.3
30-39	8	23.5	3	8.8	23	67.6
40-49	14	25.0	5	8.9	37	66.0
50-59	15	25.9	3	5.1	40	69.9
60+	47	52.8	7	7.9	35	39.2
TOTALS	265	—	30	—	159	—

Based on a study of 454 fire deaths that occurred from 1972-1977 in the state of Maryland. Source: Berl and Halpin.


Fire Casualties
100
Survival less than 6 hours
80
Survival longer than 6 hours
20
COHb greater than 50%
48
COHb less than 50%
32
Lung
10
Burns
10
COHb 30-50% + HCN and/or heart disease
16
CO not involved (< 30% COHb)
16
Rapid heat exposure
8
Miscellaneous or unknown causes (falls, heart attacks, etc.)
8

Source: Berl and Halpin

Fire Fatalities by Medical Cause

The leading medical cause of civilian fire deaths is the inhalation of smoke (toxic gases) alone or combined with burns. Berl and Halpin found that nearly 60 percent of the fire victims had carboxyhemoglobin (COHb) levels exceeding 50 percent, a concentration considered as the margin for survival. An additional 16 percent of the victims had COHb levels in the 30 to 50 percent range and were found to have also ingested substantial doses if hydrogen cyanide (HCN). There are indications from animal experiments that carbon monoxide and hydrogen cyanide act in an additive fashion, so that exposure to subiethal concentrations of these gases may prove fatal. In addition, other research has shown that persons with impaired cardiovascular systems (heart disease) have less resistance to toxic gases and tend to succumb at carbon monoxide levels less than 50 percent. In all, the preponderant involvement of smoke inhalation (toxic gases) is the primary cause of all fire deaths (75 percent of all fatalities are due to toxic gas ingestion).

References

[1]A recent paper by A. Elwood Willey analyzed reasons for the unsuccessful performance of smoke alarms. See "Factors in Unsuccessful Smoke Detector Performance in Residential Occupancies," *Fire Journal*, Vol. 73, No. 3 (May 1979), p. 42.

[2]For the key issues in evacuation planning, see Anthony O'Neill, "Escape Planning," *Fire Journal*, Vol. 38, No. 6 (November 1974), p. 10.

[3]Based on analysis of a sample of fatal fires, Halpin, Dinan, and Deters concluded that many lives could have been saved by smoke alarms. (See Byron M. Halpin, John J. Dinan, and Owen J. Deters, "Assessment of the Potential Impact of Fire Protection Systems on Actual Fire Incidents," APL/JHU FPP TR 35, The Johns Hopkins University/Applied Physics Laboratory, Laurel, MD, October 1977.)

[4]*Fire In the United States* (Fourth Edition), Federal Emergency Management Agency, Washington, DC, 1982, pp. 25-27. (Available from the National Technical Information Service, 5285 Port Royal Rd., Springfield, VA 22161.)

[5]Under contract to the United States Fire Administration, the NFPA investigated the effectiveness of proposed residential sprinkler systems.

[6]Berl, Walter C., and Halpin, Byron M., "Human Fatalities from Unwanted Fires," *Fire Journal*, Vol 73, No. 5, (September 1979), pp. 105-115.

WE WANT TO KNOW . . .

if a name, an address, or a phone number has changed; if there's an upcoming event, a new program or course, a new publication being offered. If you have more current information than is contained in this *Almanac*, know something that should be included in this book, or just have something interesting about the fire protection scene that you want to contribute, please let us know. Write: Editor, *Fire Almanac*, NFPA, Batterymarch Park, Quincy, MA 02269. All suggestions will receive our careful attention.

The Portable Kerosene Heater Controversy

The National Fire Protection Association publishes a Code regarding the use of portable unvented kerosene heaters, NFPA 31, *Installation of Oil Burning Equipment*. The recommended restrictions involve the care, maintenance, and usage of portable unvented kerosene heaters. The standard advises the users to:

- follow manufacturer's operating and installation instructions;
- preserve the manufacturer's instructions;
- maintain the heater in good repair;
- take special care in placing the device;
- carefully level the units in accordance with the manufacturer's instructions;
- fill the tank outdoors.

In addition, the Code requires that a metal tray be placed beneath the burner as an integral part of the heater and that there be a primary control to stop fuel flow in the event of flame failure. Since the Code first made these recommendations in 1951, they have not been changed, leaving the question about where portable heaters can or cannot be used unanswered. The Code Committee believes that such a decision properly belongs to whatever local authority exercises jurisdiction in the matter. In other words, if a state, city, or other entity believes that portable heaters pose a hazard, then it is the decision of that governing body to determine what use-restrictions should be imposed. No other NFPA Code imposes restrictions on the use of the heaters either. The *Life Safety Code* makes no mention of the subject. And since the NFPA does not publish a building code, there are no regulations on the types of premises where the use of portable heaters should or should not be permitted. The only exception restricting the use of heaters is when a heating device is considered to be a source of ignition in a hazardous setting. A room used to mix flammable liquids would have a requirement that only indirect heating be permitted. This would forbid the use of any heater or heating system that introduces a source of ignition to the room in question. So, any device that has an open flame in the room would be prohibited; this would include portable electric heaters.

Since the federal government has not applied any restriction on the use of portable heaters, each state or local government determines whether the devices can be sold or used locally. Until 1979, there was no local code activity because the heaters simply were not sold or used in great quantity; several states and cities already had restrictions on the use of the older style kerosene heaters popular in the 1940s and 1950s. However, these local jurisdictions became relatively easy prey to an effective marketing and lobbying effort by the "new generation" kerosene heater industry. The changes that have taken place over the past few years have been in the direction of removing or modifying the restrictions to allow for wider (or even carte-blanche) use of the portable heating units.

In 1982, there were just three states that prohibited the use of portable heaters in places of habitation: California, Massachusetts, and Wisconsin. There is open acknowledgement that these restrictions are difficult, perhaps even impossible, to enforce. Since the heaters can be sold legally in these states, control of the use to which they are put by the purchaser is nonexistent. However, in Massachusetts, the law says that the seller must notify the purchaser that the heaters are not be used in places of habitation. Although Massachusetts fire officials acknowledge that their regulation is unenforceable, they are adamant in holding to their position. In fact, they feel they have been vindicated by a recent finding published in the October 1982 issue of *Consumer Reports* which revealed that kerosene heaters are not safe and that they cause indoor pollution in amounts that exceed acceptable levels for outdoor pollution.

Until 1981, New Hampshire prohibited the sale of kerosene heaters. However, an injunction was granted that overturned this prohibition, and subsequent legislative changes then permitted the use of the heaters in private dwellings, provided the user acquired a use-permit from his local fire department. Since fire chiefs decided that they would refuse to issue any permits, the situation is unresolved.

Other states that had restrictions on the use of the devices in places of habitation, but that have since modified those restrictions to allow their use in private dwellings, are Maryland, Delaware, and New York. In many states, however, local jurisdictions can enforce regulations that differ from state provisions. This can create a great deal of confusion for the consumer and a great deal of work for lawyers. New Haven, Connecticut was the scene of an arrest of a storeowner who sold heaters. Heaters cannot be sold legally within that city. Needless to say, a case such as this would be hotly contested and closely watched.

There is very little data available on fire loss and fatalities due to kerosene heaters and data that typically comes to NFPA is "severity-biased," i.e., only serious incidents that involve loss of life, substantial property damage, many and serious injuries, or unusual circumstances. Minor incidents usually are unreported to NFPA. With this in mind, NFPA fire records do not show a substantial increase in the number of reported incidents related to use of the new style heater. Considering that there are now several million such units in use, this fact may be noteworthy. On the other hand, increased use of kerosene heaters will cause an increase in the number of fires associated with these heaters. The same may be said of increased use of portable electric heaters, or even of electric blankets. So, based on available NFPA data (or lack thereof), a convincing case against the use of the heaters cannot be established.

There is no question that, as the heaters remain in use, they will deteriorate and will tend to malfunction. Incidents will undoubtedly increase on this account. Similarly, increased storage of kerosene will undoubtedly result in fires where the fuel becomes a factor in the spread and intensity of the fire. NFPA will continue to hear, more and more frequently, of instances of the misuse of the heater and of the use of improper fuels.

U.S. Civilian Deaths and Injuries, 1977-81

1977-81 Civilian Fire Deaths

Estimates of total U.S. civilian fire deaths for the period 1977-81 indicate that, on the average, 7,175 civilians died annually from fire. Major differences in total civilian fire death estimates for 1977-78 (7,395 to 7,710) and 1979-80 (7,575 to 6,505) can in large part be attributed to differences in estimates of vehicle fire deaths for those years. This factor should be considered when interpreting 1977-78 and 1979-80 total civilian fire death results. (Estimates of civilian deaths due to vehicle fires will be discussed later in this section.)

The NFPA feels that trend analysis of civilian deaths for the 1977-81 period should focus on estimates of civilian deaths in structure fires, since these estimates are based on fairly accurate reported data to the NFPA in its annual sample survey and FIDO (Fire Incident Data Organization) System. Over the 1977-81 period, an average of 6,050 civilians died annually in structure fires. Most of these deaths (96.1 percent or an annual average of 5,814 deaths) occurred in fires in residential structures. In particular, fires in the home (one- and two-family dwellings and apartments) resulted in 92.5 percent of all structure deaths, or an annual average of 5,596 deaths. The graph on p. 150 shows civilian fire deaths and rates in the home in the United States for 1977-81. The number of civilian fire deaths in the home reached its high level of 6,015 deaths in 1978, declined to 5,500 in 1979, and declined further to 5,200 deaths in 1980. Overall, there was a 13.5 percent decrease in civilian home fire deaths from 1978-80. However, fires in the home took 5,400 civilian lives in 1981, an increase of 3.8 percent from 1980, reemphasizing the need to continue home firesafety education on topics such as common causes of fatal fires in the home, the use and maintenance of smoke detectors, and escape planning. (For more details on the causes of fatal fires, see sections "Ignition Scenarios of One- and Two-Fatality Fires and Profiles of

Highlights of 1977-81 U.S. Fire Experience

- An average of 7,175 civilians died annually from fire.
- An average of 6,050 civilians died annually in structure fires, 84.3 percent of all fire deaths.
- Most of the structure fire deaths, 96.1 percent or an annual average of 5,814 deaths, occurred in fires in residential structures; in particular, fires in the home (one- and two-family dwellings and apartments) accounted for 92.5 percent of all structure-fire deaths, or an annual average of 5,596 deaths. The number of civilian fire deaths in the home, after reaching its high level of 6,015 deaths in 1978, showed a steady decline to 5,500 in 1979 and to 5,200 deaths in 1980. However, fires in the home took 5,400 civilian lives in 1981, an increase of 3.8 percent from 1980.
- About 12 percent of all civilian fire deaths in structures occurred as a result of incendiary or suspicious fires over the five-year period.
- Annual estimates of civilian injuries indicate little change from year to year and show that on the average, about 30,600 civilians are injured annually. (This estimate for civilian injuries is on the low side, due to underreporting of civilian injuries to the fire service.)
- Total fires attended by public fire departments reached their high in 1977 at 3,264,500 fires, decreased a considerable 13.6 percent in 1978 to 2,817,500 fires, and changed little after that. On the average, fire departments attended 2,961,800 fires annually.
- Estimates of structure fires indicate little change from year to year, and show that on the average, 1,057,800 structure fires occurred annually, accounting for 36 percent of all fires.
- An average of 738,500 fires or 70 percent of all structure fires occurred annually in residential properties.
- Property loss from fire increased over the 1977-81 period. For structure fires, estimated property damage of $4,125,000,000 in 1977 compared to $5,976,000,000 in 1981, an increase of 45 percent. Most of the increase in property damage appears to be due to the effects of inflation.
- One- and two-family dwellings contributed an average of 43 percent of the total property damage in structures over the 1977-1981 period: this was followed by industry, utility, and defense at 14 percent, stores and offices at 11 percent, and storage at 10 percent.

Fire Victims" and "Multiple-Death Fires.") The graph also displays civilian fire deaths in the home per million population, and a trend similar to the number of civilian fire deaths in the home can be seen.

Over the 1977-81 period, fires in nonresidential structures resulted in an annual average of 238 deaths, or 3.9 percent of all civilian fire deaths in structures. It should be noted that one large loss-of-life fire can have a tremendous impact on this statistic, as in 1977 when the Beverly Hills Supper Club fire claimed 165 lives. Taking this incident into account, the number of civilian fire deaths in nonresidential structures changed little over the five-year period.

As noted earlier, estimates of civilian deaths due to vehicle fires (particularly highway vehicle fires) may be somewhat unreliable, because of the difficulty in determining the cause of death in cases when a death occurred in a vehicle accident with a subsequent fire — i.e., was the death due to impact or to the fire itself? It should be noted that the NFPA has made a strong effort to verify all reported vehicle fire deaths in the 1981 survey, with follow-up calls to fire departments to determine whether a reported vehicle death was caused by impact or fire. The estimate of 1981 civilian fire deaths due to highway vehicle fires, based on verified data, is 770, compared to an estimate of 1,035 based on originally

ESTIMATES OF US CIVILIAN FIRE DEATHS BY SELECTED PROPERTY BREAKDOWNS (1977-81)

	1977	*1978*	*1979*	*1980*	*1981*
Structure (total)	6,505	6,350	5,970	5,675	5,760
Residential[1]	6,135	6,185	5,765	5,446	5,540
Nonresidential[2]	370[3]	165	205	229	220
Vehicle[4]	740	1,255	1,535	740	840
Other[5]	150	105	70	90	100
TOTAL:	7,395	7,710	7,575	6,505	6,700

Estimates are based primarily on data reported to the NFPA by fire departments that responded to the NFPA's Annual Survey of Fire Departments for U.S. Fire Experience (1977-81); some of the estimates are based on data reported to the NFPA in the FIDO (Fire Incident Data Organization) System.

[1] Includes one- and two-family dwellings, apartments, hotels and motels, and other residential properties.

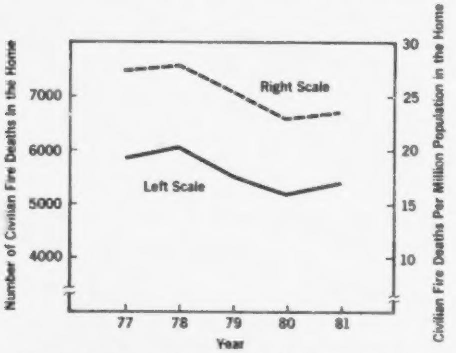
[2] Includes public assembly, educational, institutional, stores and offices, industry, utility, storage, and special structure properties.

[3] Includes the Beverly Hills Supper Club fire that took the lives of 165 people.

[4] Includes highway and other vehicles (e.g., trains, ships). Estimates for 1977-79 were based on data reported by fire departments but unverified, while estimates for 1980-81 were based on reported data by fire departments that were verified. Because of this factor, vehicle estimates for 1978 and 1979 may be on the high side and should not be compared to estimates for 1980-81.

[5] Includes outside properties with value, brush, rubbish, and other.

Civilian Fire Deaths and Rates In the Home* in the US (1977-81)



Source: NFPA's Annual Survey of Fire Departments for US Fire Experience (1977-81).

*Includes one- and two-family dwellings and apartments.

reported data; this type of verification was also made for the 1980 survey. No such effort was implemented in the 1977-79 surveys and this may partially account for the high estimates of vehicle fire deaths in 1978 and 1979.

About 12 percent of all civilian fire deaths in structures occurred as a result of incendiary or suspicious fires during the 1977-1981 period.

1977-81 Civilian Injuries

The results shown here are based on the NFPA's Annual Survey of Fire Departments for U.S. Fire Experience (1977-81). It should be kept in mind that due to underreporting of civilian injuries to the fire service (e.g., minor injuries that did not require immediate medical attention, injuries that occurred at small fires that the fire department did not

ESTIMATES OF U.S. CIVILIAN FIRE INJURIES BY SELECTED PROPERTY BREAKDOWNS AND YEAR (1977-81)

	1977	1978	1979	1980	1981
Structure (total)	26,310	24,985	24,850	24,725	25,700
Residential[1]	22,600	21,260	20,450	21,100	20,375
Nonresidential[2]	3,710	3,725	4,400	3,625	5,325
Vehicle[3]	3,515	3,720	5,175	4,075	3,400
Other[4]	1,365	1,120	1,300	1,400	1,350
TOTAL	31,190	29,825	31,325	30,200	30,450

Estimates are based on data reported to the NFPA by fire departments that responded to the NFPA's Annual Survey of Fire Departments for U.S. Fire Experience (1977-81); adjustments were made based on data reported to the NFPA in the FIDO (Fire Incident Data Organization) System.

[1] Includes one- and two-family dwellings, apartments, hotels and motels, and other residential properties.

[2] Includes public assembly, educational, institutional, stores and offices, industry, utility, storage, and special structure properties.

[3] Includes highway and other vehicles (e.g., trains, ships).

[4] Includes outside properties with value, brush, rubbish, and other.

attend, or injured persons who may not have been transported to medical facilities by the fire service), the NFPA feels that the annual estimates for civilian injuries are on the low side.

Annual estimates of U.S. civilian fire injuries for the 1977-81 period indicate little change from year to year and show that on the average, about 30,600 civilians are injured annually. Over the five-year period, residential fires accounted for about 69 percent of all civilian injuries reported to fire departments.

1977-81 Number of Fires and Property Loss

Total fires attended by public fire departments during the 1977-81 period were at their highest in 1977 at 3,264,500 fires. Fires decreased a considerable 13.6 percent in 1978 to 2,817,500 fires; changed little in 1979 at 2,845,500 fires; increased 5 percent in 1980 at 2,988,000 fires; and decreased a slight 3.5 percent in 1981 at 2,893,500 fires. On the average, over the five-year period, public fire departments attended 2,961,800 fires annually.

Over the 1977-81 period, estimates of the number of structure fires indicated little change from year to year, and on the average, 1,057,800 structure fires occurred annually, accounting for 35.7 percent of all fires. Also, over the five-year period, vehicle fires accounted for an annual average of 488,900 fires or 16.5 percent of all fires, while outside fires and others accounted for an annual average of 1,415,100 fires or 47.8 percent of all fires. An average of 738,500 fires occurred annually in residential properties, accounting for 70 percent of all structure fires over the five-year period.

Direct property damage from fire increased over the 1977-81 period. In 1977, total fires resulted in an estimated property damage of $4,709,000,000 compared to $6,676,000,000 in 1981, for an increase of 42 percent over the five-year period. For structure fires, an estimated $4,125,000,000 in property damage occurred in 1977 compared to $5,976,000,000 in property damage in 1981, an increase of 45 percent over the five-year period. It should be noted that most of the increase in property damage over the five-year period appears to be due to the effects of inflation; when property loss in structure fires is adjusted for inflation, there is hardly any change in structure property damage over the five-year period (see graph next page).

Structure fires accounted for an average 88 percent of all fire property loss annually

ESTIMATES OF NUMBER OF FIRES ATTENDED BY FIRE DEPARTMENTS BY MAJOR PROPERTY USE IN THE UNITED STATES BY YEAR (1977-81)

	1977	1978	1979	1980	1981
Residential (Total)	750,000	730,500	721,500	757,500	733,000
One- and Two-Family Dwellings*	584,500	569,000	550,500	590,500	574,000
Apartments	139,000	137,500	146,000	143,500	137,000
Hotels and Motels	14,000	12,000	11,500	11,500	11,500
Other Residential	12,500	12,000	13,500	12,000	10,500
Public Assembly	34,000	29,500	30,500	29,000	28,500
Schools and Colleges	19,000	20,500	22,500	19,500	19,500
Institutions	24,500	39,000	29,500	28,000	27,000
Stores and Offices	70,000	63,500	64,000	62,000	65,500
Industry, Utility, Defense**	54,500	55,000	58,000	55,000	49,000
Storage in Structures	73,000	59,500	64,500	65,500	62,000
Special Structures	73,000	64,500	46,000	48,500	43,000
TOTAL STRUCTURE FIRES	1,098,000	1,062,000	1,036,500	1,065,000	1,027,500
Outside Fires (with value)	130,000	110,000	80,500	86,500	81,000
Vehicles***	508,000	503,000	495,500	471,500	466,500
Brush, Grass, Wildland (no value)	734,000	582,500	614,500	718,500	711,000
Rubbish	406,000	296,000	342,000	397,000	341,000
All Other	388,500	264,000	276,500	249,500	266,500
TOTAL FIRES	3,264,500	2,817,500	2,845,500	2,988,000	2,893,500

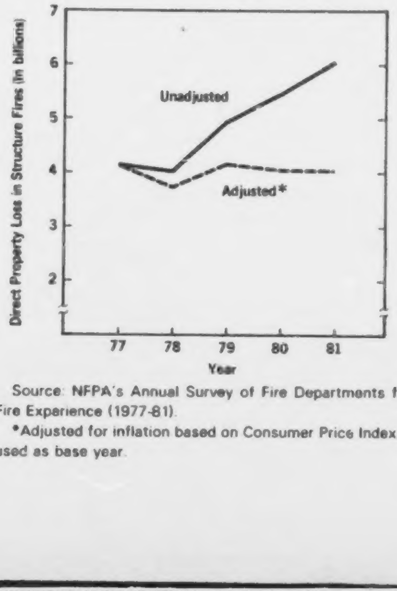
Estimates are based on data reported to the NFPA by public fire departments that responded to the NFPA's Annual Survey of Fire Departments for U.S. Fire Experience (1977-1981). No adjustments were made for fires not attended by the public fire service.

*Includes mobile homes.

**Since some incidents for these property uses were handled only by private fire brigades or fixed suppression systems and were not reported to the NFPA, the results represent only a portion of U.S. fire experience.

*** This category includes highway vehicles, trains, boats, ships, aircraft, farm vehicles, and construction vehicles.

Direct property loss in structure fires for unadjusted and adjusted estimates in the US (1977-81).



Source: NFPA's Annual Survey of Fire Departments for US Fire Experience (1977-81).

*Adjusted for inflation based on Consumer Price Index; 1977 used as base year.

ESTIMATES OF DIRECT PROPERTY LOSS BY MAJOR PROPERTY USE IN THE UNITED STATES BY YEAR (1977-81)

	1977	1978	1979	1980	1981
Residential (Total)	$2,179,000,000	$2,192,000,000	$2,529,000,000	$3,042,000,000	$3,259,000,000
One- and Two-Family Dwellings*	1,712,000,000	1,784,000,000	2,034,000,000	2,447,000,000	2,713,000,000
Apartments	325,000,000	310,000,000	343,000,000	401,000,000	415,000,000
Hotels and Motels	118,000,000	82,000,000	100,000,000	154,000,000	99,000,000
Other Residential	24,000,000	16,000,000	52,000,000	40,000,000	32,000,000
Public Assembly	286,000,000	194,000,000	284,000,000	326,000,000	356,000,000
Schools and Colleges	139,000,000	111,000,000	79,000,000	101,000,000	184,000,000
Institutions	15,000,000	14,000,000	34,000,000	25,000,000	38,000,000
Stores and Offices	452,000,000	475,000,000	457,000,000	645,000,000	642,000,000
Industry, Utility, Defense**	526,000,000	594,000,000	966,000,000	672,000,000	775,000,000
Storage in Structures	451,000,000	342,000,000	507,000,000	512,000,000	616,000,000
Special Structures	77,000,000	100,000,000	108,000,000	131,000,000	106,000,000
TOTAL STRUCTURE LOSS	$4,125,000,000	$4,022,000,000	$4,964,000,000	$5,454,000,000	$5,976,000,000
Outside Fires (with value)	144,000,000	32,000,000	38,000,000	61,000,000	61,000,000
Vehicles***	332,000,000	391,000,000	682,000,000	885,000,000	594,000,000
All Other	108,000,000	53,000,000	66,000,000	54,000,000	45,000,000
TOTAL PROPERTY LOSS	$4,709,000,000	$4,498,000,000	$5,750,000,000	$6,254,000,000	$6,676,000,000

Estimates are based on data reported to the NFPA by public fire departments that responded to the NFPA's Annual Survey of Fire Departments for U.S. Fire Experience (1977-1981); minor adjustments were made based on data reported to the NFPA in the FIDO (Fire Incident Data Organization) System. Dollar loss figures represent direct property loss only (loss to contents, structure, a vehicle, machinery, vegetation or anything else involved in a fire), and do not include indirect losses (e.g., business interruption or temporary shelter costs). Dollar loss estimates are based on figures reported by departments for a year, and no adjustments were made for inflation over the five year period.

*Includes mobile homes.

**Since some incidents for these property uses were handled only by private fire brigades or fixed suppression systems and were not reported to the NFPA, the results represent only a portion of U.S. fire experience.

***This category includes highway vehicles, trains, boats, ships, aircraft, farm vehicles, and construction vehicles.

during the 1977-81 period. Fires in one- and two-family dwellings accounted for an annual average of 43 percent of all structure fire loss during the five-year period—by far the leading property use contributing to total loss. Other property categories contributing heavily to total structure property loss were industry, utility, and defense (an average of 14 percent for the five years), stores and offices (11 percent), and storage (10 percent). Fires in vehicles accounted for an annual average of 10 percent of all property loss. (Every year, over 10 percent of total property damage in the United States results from "large-loss" fires; for more details see *Almanac* section on "Large-Loss Fires.")

Fire Experience of Large Cities

(Note: This section is based on a recently completed study, *Statistical Abstract of Fire Experience For Large Cities*, which was prepared by the Federal Emergency Management Agency (FEMA). The major objective of the study was to display the fire experience of U.S. cities with populations greater than 50,000. The data for the study was based primarily on the NFPA Annual Sample Survey for U.S. Fire Experience and FEMA's National Fire Incident Reporting System. Because of severe time limitations faced by FEMA to complete the study, editing of the data was not as complete as desired, and hence some errors may still remain, but for the most part the data is believed accurate.

The complete report *Statistical Abstract of Fire Experience for Large Cities* by FEMA is planned for publication at a future date, and will be available from the National Technical Information Service. The complete report contains 139 entries for each city greater than 100,000. The abridged results presented here include 29 entries for cities with populations greater than 100,000 and focus on total fire losses and residential losses; no results are included here for cities with populations of 50,000 to 99,999. The following includes portions and condensations of the FEMA report as applicable to the selected results presented here.)

Introduction

United States fire statistics in the past have generally emphasized the overall aggregated characteristics of the nation's fire experience. For some time, however, there has been a need for detailed statistics on the experience of individual fire departments. Such statistics can focus on the most serious fire problems, an important first step toward achieving reductions in the nation's fires, casualties, and property loss.

This *Statistical Abstract* summarizes the fire experience of U.S. cities with populations greater than 50,000. It presents a record of fires and losses over several years, thereby providing a measure of average activity and also an indication of change. This data should enable a city to compare its fire experience with other similar cities, and perhaps to identify those areas that need improvement. However, caution must be exercised in drawing conclusions from direct comparisons between cities due to the numerous factors that affect fire, casualty, and loss rates. (NFPA staff note: In particular, the fire problem for a city is often best examined in terms of high and low fire risk areas of a city and how these may change over time. Socioeconomic factors that relate to high and low fire risk areas within a city have been well-studied, [1-6] as well as the relationship of certain demographics to fire cause.[7,8])

Data Sources

One source of data used in the *Statistical Abstract* was the annual NFPA *National Fire Experience Sample Survey* of fire departments. This survey is mailed to all cities greater than 100,000 population, and to about half the cities with populations between 50,000 and 100,000. A second data source was the National Fire Incident Reporting System (NFIRS). For those cities participating, the NFIRS data was used when NFPA data was unavailable, either for an entire year or to fill missing entries. It is important to note that for many fire departments, NFIRS data tapes do not contain reports on all fires attended. In such cases, the NFIRS data will not provide accurate estimates of fires, casualties, or dollar loss. In most cases the NFIRS data was used only when it was judged that at least 90 percent of the incidents were included. A third source of data (occasionally used) was the responses to the Fire Department Characteristics Study conducted by Economic and Engineering Research, Inc. (EER) under a contract with FEMA/USFA. An EER questionnaire was sent to fire departments in twelve NFIRS states, and provided fire information primarily on total fires attended and total losses.

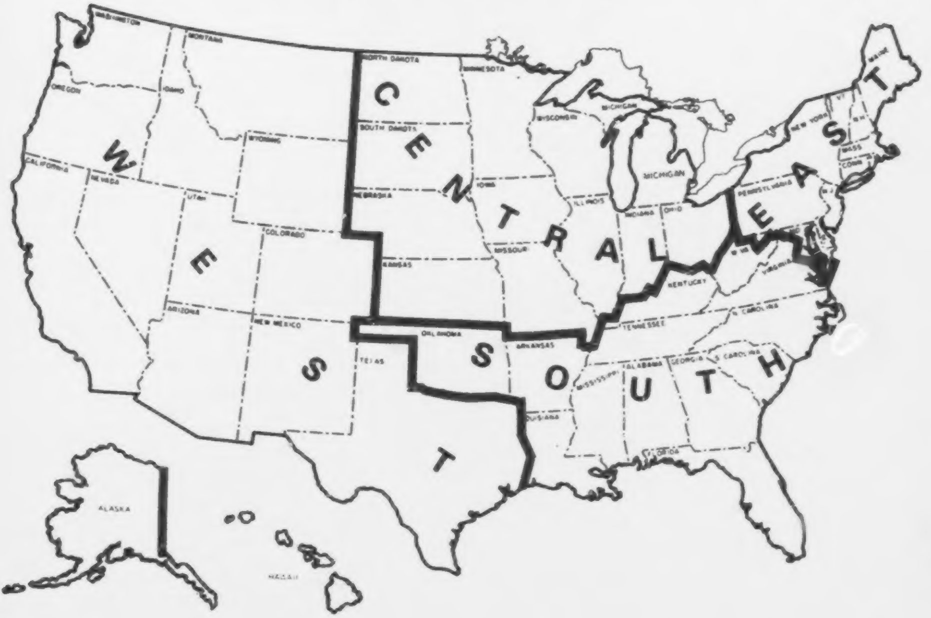
When the data from the three sources did not agree, which occurred frequently, the largest value was usually selected since under-counting is by far a more serious problem than over-counting. One undesirable feature in mixing data sources for the same year is that the detailed breakdown of fires and losses may not properly sum to the subtotal and total values.

The NFPA and NFIRS data were combined on a detailed worksheet and mailed to practically all cities greater than 100,000, asking them to verify the data and supply missing information. More than half the cities responded.

Organization of Tables

In order to facilitate more meaningful comparisons, the cities have been divided geographically into four regions — East (or Northeast), Central (or North Central), South, and West — as shown on the map. The least homogeneous region is the West, which extends over a wide geographical area with large variations in climate.

U.S. REGIONS


WEST
CENTRAL
EAST
SOUTH
WASHINGTON
OREGON
CALIFORNIA
NEVADA
IDAHO
MONTANA
WYOMING
UTAH
COLORADO
ARIZONA
NEW MEXICO
NORTH DAKOTA
SOUTH DAKOTA
NEBRASKA
KANSAS
MINNESOTA
IOWA
MISSOURI
WISCONSIN
ILLINOIS
MICHIGAN
INDIANA
OHIO
KENTUCKY
TENNESSEE
OKLAHOMA
TEXAS
ARKANSAS
LOUISIANA
MISSISSIPPI
ALABAMA
GEORGIA
S. CAROLINA
N. CAROLINA
FLORIDA
VIRGINIA
PENNSYLVANIA
NEW YORK
MAINE
VT
MASS
CONN
ALASKA
HAWAII

The complete FEMA report contains 139 entries for each city greater than 100,000 population. The selected results presented here include 29 entries for cities with populations greater than 100,000 and focus on total fire losses and residential fire losses. The tables summarize fire experience for cities greater than 100,000 by region. In all, data is presented for 169 cities with populations of 100,000 or more.

Explanation of Column Headings

In lieu of providing extensive footnotes for the tables, this section explains the column headings, and defines the special symbols. Some explanatory remarks are also included.

Total Fire Losses

Col. 1 contains the 1980 Census population of the city.

Col. 2 contains the fire department's stated population protected which includes persons residing outside the city, for the most recent year of the NFPA survey. The symbol " indicates that only the population within the city is protected, which for 1980 is the number in Col. 1.

Col. 3 shows the data years. The numbers refer to the last digit of the three most recent years for which data is presented. These define the years denoted in subsequent columns by Y1, Y2 and Y3. (The symbol + denotes that a substantial portion of the data was furnished directly by the fire department.) If the NFIRS data alone was used in a certain year the digit is underlined; if both NFIRS and NFPA data were used, a " symbol is used; otherwise only NFPA data was used. For example, 1 9"7 means that the most recent year (Y1) is 1981 and NFIRS data alone was used; the next year's available data (Y2) was for 1979 and a combination of NFIRS and NFPA data was used; and the third year's available data (Y3) was 1977 and only NFPA survey data was used.

Cols. 4-6 contain the total number of fire incidents. Y1 - Y3 refer to the three years of data, in the order specified in Col. 3. A value of zero is denoted by a dash (-).

Col. 7 shows the fire rate expressed as the average number of fires per year per 100,000 persons, i.e., the three-year average — Col. 4 plus Col. 5 plus Col. 6 divided by 3 — divided by Col. 2 (times 100,000). If only two years data were available, the two-year average — Col. 4 plus Col. 5 divided by 2 — is used. Rates are the most useful measure for comparing fire experience for cities of different sizes. Rates for injuries, deaths, and property loss are not shown but could be calculated similarly.

Cols. 8-10 contain the property loss for each year in thousands of dollars.

Cols. 11-16 contain the number of injuries or deaths in each year.

Residential Fire Losses

Cols. 33-45 are similar to Cols. 4-16. The principal residential categories are dwellings (one- and two-family) and mobile homes; apartments; hotels and motels; and rooming houses, dormitories, and miscellaneous.

References

[1] Hall, John R., Jr., and Karter, Michael J., Jr., "Fire Rates vs. Community Characteristics: Supplemental Technical Report," Washington, Urban Institute, 1976.

[2] Schaenman, Philip S., *et al.*, *Procedures for Improving the Measurement of Local Fire Protection Effectiveness*, Boston: National Fire Protection Association and Urban Institute, 1974.

[3] Karter, Michael J., Jr., and Donner, Allen, "The Effect of Demographics on Fire Rates," *Fire Journal*, Vol. 72, No. 1, January 1978, p. 53.

[4] *Community Characteristics and the Incidence of Fire: An Empirical Analysis*, Princeton: Princeton University, 1977.

[5] *Residential Fires and Urban Neighborhoods: An Empirical Analysis of Charlotte, North Carolina*, Princeton: Princeton University, 1977.

[6] *Baton Rouge Fire Household Survey*, Sunbelt Research Corporation, 1979.

[7] Gunther, Paul, "Fire Cause Patterns for Different Socioeconomic Neighborhoods in Toledo, Ohio," *Fire Journal*, Vol. 75, No. 3, May 1981, p. 52.

[8] *Neighborhood Analysis of Fire Causes: A Case Study of Toledo, Ohio*, Washington: Federal Emergency Management Agency, U.S. Fire Administration, 1981.

FIRE LOSSES FOR CITIES GREATER THAN 100,000

CITY	POPULATION		Years Data	TOTAL							
	City (Census 1980)	Total Pop'n Prot'd		FIRES				LOSS 000)			INJ
				Y1	Y2	Y3	Rate	Y1	Y2	Y3	Y1
	1	2	3	4	5	6	7	8	9	10	11
MASSACHUSETTS											
Boston	562 994	"	1+0 9	15190	18977	18690	3130	20569	19587		805
Worcester	161 799	"	0 8 7	5516	5418	3920	3060	2997			
Springfield	152 319	"	0 8 7	4366	5182	3207	2791			4134	
CONNECTICUT											
Bridgeport	142 546	"	1+0+9	6922	5881	6092	4418	5343	4928	5145	46
Hartford	136 400	"	1"0"9	3657	4028	4944	3084	2417	-	2423	33
New Haven	126 109	"	1 0 9	4232	4399	4256	3406	2927	4690	3084	37
Waterbury	103 266	"	1 0 9		3285	2120	2617	1976	2843	2437	
Stamford	102 453	60000	0 9	1514	1450		2470				
RHODE ISLAND											
Providence	156 804	"	1	5272			3369				
NEW YORK											
New York	7071 639	"	1+0+9	122261	127876	114370	1718				
Buffalo	357 870	"	1 0 9	6603	6370		1813	15967	11912	11174	40
Rochester	241 741	"	1 0 8	2967	2444	3510	1230				
Yonkers	195 351	"	1 0 9	4264	3447	4189	2030	9806	4633		32
Syracuse	170 105	"	1 9 8	2230	2291	2275	1332	5778			101
Albany	101 727	"	1 0 9	1510	1071		1269		3394		
PENNSYLVANIA											
Philadelphia	1688 210	"	1+0 9	25324	27348	22944	1493				368
Pittsburgh	423 938	"	1 0 7	7738		4818	1481				57
Erie	119 123	"	7	2399			2014	840			
Allentown	103 758	"	1+0+		2044		1970	2529	2472		26
NEW JERSEY											
Newark	329 248	"	1 0 9	7566	7393	6603	2183				
Jersey City	223 532	"	1 0 9		7874	8408	1225				94
Paterson	137 970	"	1 0 9			1853	1343	4000	5400	4063	
Elizabeth	106 201	"	9 8	1873	1488		1582				
MARYLAND											
Baltimore	786 775	"	1 0 9	11818	13782	10494	1529		11620		176
DIST OF COL.	637 651	"	1+0 9	9571	9843	7601	1412	10096	9843	10426	280

POPULATION (EAST REGION)

					TOTAL RESIDENTIAL												
URIES		DEATHS			FIRES				LOSS (000)			INJURIES			DEATHS		
Y2	Y3	Y1	Y2	Y3	Y1	Y2	Y3	Rate	Y1	Y2	Y3	Y1	Y2	Y3	Y1	Y2	Y3
12	13	14	15	16	33	34	35	36	37	38	39	40	41	42	43	44	45
107	204	28	17	24	2732	1097	951	283	9668	6495	6221	240	94	187	27	17	21
	41	10	4		360	336	557	258									
47	38	12	6	3													
33		8	2	1	1404	1404	1621	1036	3195	2001		41	25		8	2	1
10	11	6	8	6	418	519	484	347	1772	1317		30	10	8	4	7	4
31	27	4	9	7	311	292	212	215	2094	2104	1943	30	30	27	4	8	7
42	31	3	5	5		420		407	1438				30	25	3	5	5
		4			922			588							3		
	476	246	289	244	31156	32179	31504	447							213	253	208
51	64	10	16	22	1782	1809	1795	502	5884	4747	4877	40	51	64	12	14	22
		14		10	1029	1255	1146	473							14		10
18		7	3	6	181	234		106	2405	2593		23	14		6	2	
80	61	13	10	11	999	727	445	425	4545	964		77	53	54	13	10	11
36	11	8	2		320	248	290	281		1464	851		35	11	5	7	2
		78	83	106	4235	4500	4078	253							75	83	96
		13		14	1162			274	3630			43			13		
		1			1290			1083							1		
59		-	6		233	387		299	1500						-	6	
		26		37	1727	1433	1842	506							25		37
145	113	30	16	24	3272	3338	3524	611						113			24
	39	16	4	12	508	446	350	315							16	2	11
			4		383	396		367								4	
174	197	29	51	41	3614	4051	2896	447					139	173		45	37
130	186	29	28	48	1352	1960	2176	287	4316	6373	4904		106	160		28	34

FIRE LOSSES FOR CITIES GREATER THAN 100,000

CITY	POPULATION			TOTAL						
	City (Census 1980)	Total Pop'n Prot'd	Years Data	FIRES				LOSS (000)		
				Y1	Y2	Y3	Rate	Y1	Y2	Y3
	1	2	3	4	5	6	7	8	9	10
OHIO										
Cleveland	573 822	-	1¯0+9	8546	8638	9874	1572	15236	17649	15796
Columbus	564 871	-	1+0̅+9	5919	5846	5413	1014	9256	15712	8500
Cincinnati	385 457	-	1¯0¯9	4025	4039	4508	1087	5802	11565	6707
Toledo	354 635	-	1+0 9	4012	4599	5036	1283	9901	10080	12872
Akron	237 177	-	1¯0+9¯	2114	2214	2489	958	10552	3824	4382
Dayton	203 371	-	1 0 9	2569	2891	2965	1381		4064	
Youngstown	115 436	-	1̲ 0̲ 9̲	942	2303	1892	1683	2512	2281	
INDIANA										
Indianapolis	700 807	-	1 0 9	8311	10727	3939	1093			3835
Fort Wayne	172 196	-	1 0 9	1803	2132	2125	1173	2210		
Gary	151 953	-	1+0+9	2442	2473	2770	1686	2237	2305	3973
Evansville	143 300	-	1+0+9	2470	2570	1990	1635	4783	3659	3873
South Bend	109 727	-	1 0 7	2142	2073	2857	2148	1158	1905	632
ILLINOIS										
Chicago	3005 072	-	1 0 9	50238			1672			
Rockford	139 712	-	1	1886			1350	2818		
Peoria	124 160	144000	1̅+0+9	544	612	716	433	3342	2460	2028
MICHIGAN										
Detroit	1203 339	-	0 9 8	18051			1500	33937		
Grand Rapids	181 843	-	1̅¯0̅¯9̅	1561	1512		845	3329	3463	
Warren	161 134	-	1¯0¯9̅¯	1159	1216	1499	801	2916	2721	4123
Flint	159 611	-	1̲ 0¯9¯	1356	1259		819	3178	3145	
Lansing	130 414	-	1̲ 0 9	798	683	3362	1238	1152	1113	
Sterling Heights	108 999	-	1̅¯0̅+9	731	680	754	662	1013	944	904
Ann Arbor	107 966	-	1¯0̅¯9̅¯	603	581	660	569	1911	1347	831
Livonia	104 814	-	1¯0¯9̲	815	678	458	620	1315	2835	916
WISCONSIN										
Milwaukee	636 212	-	1 0+9	5429	5615	5809	883	10522	12306	13494
Madison	170 616	-	1 0 9̲+	891	921	899	538	3055	2080	3032
MINNESOTA										
Minneapolis	370 951	-	1+0+9	3698	5209	4820	1233	11331	18273	15725
St. Paul	270 230	-	1+0+9	2354	2555	2352	896	4720	8255	5480
IOWA										
Des Moines	191 003	-	1 0̲ 9	2029	2286	2201	1137	3857	3100	5492
Cedar Rapids	110 243	-	1+0̅+9	2312	2336	2365	2120	2269	1628	1323
Davenport	103 264	-	1¯0̲ 9¯	969	1019		963	826	846	801
NEBRASKA										
Omaha	314 255	333083	1 0+	3276	3326		991	536	5166	
Lincoln	171 932	-	1+0̲ 9	937	1005	2256	814	1558	2756	932
MISSOURI										
St. Louis	453 085	-	1 0 9	9778	11033	10822	2327			
Kansas City	448 159	-	1+0+9	8305	7587	6925	1697	13135	10500	12393
Springfield	133 116	-	0 9 8	1188		1071	849	4455		2217
Independence	111 806	-	0̲̅ 9̲̅ 8	1159		1091	1006	2884		2241
KANSAS										
Wichita	279 272	-	1¯0 9	2328	2667	2212	866	5117	3872	2262
Kansas City	161 087	-	1¯0 9	3015	3663	2392	1877	3121	4837	2182
Topeka	115 266	-	1̲ 0 9	1035	1274	2342	1345	3248	2397	

POPULATION (CENTRAL REGION)

						TOTAL RESIDENTIAL												
INJURIES			DEATHS			FIRES				LOSS (000)			INJURIES			DEATHS		
Y1	Y2	Y3	Y1	Y2	Y3	Y1	Y2	Y3	Rate	Y1	Y2	Y3	Y1	Y2	Y3	Y1	Y2	Y3
11	12	13	14	15	16	33	34	35	36	37	38	39	40	41	42	43	44	45
288	250	233	40	60	32	1283	1494	1547	251	5472	6047	5606	177	107	162	32	36	40
178	110		16	19	10	1627	1616	1636	288	3909	4816	3449		136	134	13	16	9
85	98	103	16	17	20	1399	1401	1519	373	3627	4275	2684	72	64	76	13	14	18
229			16	6	13	967	1201	1237	320	3291	4145	3289	73	53	95	13	6	13
97	53	95	5	17	14	543	640	627	254	1707	2070	1676	97	53		5	15	14
56	59	160	12	10	21	752	768	861	390	1934	1628	1692	46	40		5	10	19
26	14		6	13		246	167	199	177	1311	871	833	25	10	16	6	11	6
	156	202	16	14	14	1220	2385	1465	241			2220		156	162		13	14
51			3			650	741	755	415							3	7	
4	19	33	1	7	9	743	838	993	565									
13	16	21	8	3	4			561	391			1454	13	16	16	8	3	4
27	20	12	2	7	6	349	931		583	411	1506		25	19		2	7	
			170	186	183	8977			299							156	176	171
19			4			382			273	1683			11					4
40			10	5	2	227	309	282	189	1342	1772	1005				10	5	2
224			59			5025	5224	4573	411	14822	15990	10137	151	145	153	49	50	30
29	42		5	5		395	468	421	235	1859	1864	1370	19	36	23	5	3	4
22	12	30	3	-	1	156	140	199	102	1152	751	677	13	9	13	1	-	1
14	25		6	5		458	435	448	280	2151	1934	1672	14	19	27	6	5	2
20	33		1	3	2	236	237	250	185	780	804	1122	16	25	14	1	3	2
13	9	10	2	1	1	141	118	129	119	692	453	506	13	7	7	2	1	1
22	26	14	1	-	2	148	159	160	144	985	805	452	1[illegible]	23	14	1	-	2
6	8	7	-	1	1	67	76	74	69	604	588	359	4	8	4	-	1	1
			18	17	17	1560	1587	1554	246	6528	5958	5858				17	17	17
32	30	43	2	3	2	299	312	271	172	943	1517	1056	25	21	28	2	3	-
39	72	73	5	21	18	1035	1800	1695	407	6750	6077	5037	35	59	59	4	16	18
32	25	42	3	2	4	600	424	506	189	1857	2850	1645	24	24	29	3	1	3
	19	52	3	6	8	376	486	505	239	2241	1721	2209		10	49	3	4	11
20			2	-	-		448	472	417	634	905	880	16			2	-	-
6	18	10	1	1	1	191	193	142	170	499	383	477	5	9	8	1	1	1
53	45		8	3		745	686		215				35	26		6	3	
15	14	18	-	1	-	214	198	673	210	736	692	652	7	3	14	-	-	-
		114		24	27	2223	2644	2649	553						95		24	26
119	57		37	17	20	1341	1427	1476	316	7486	5889	6458	119			34	16	18
11		27	2		3	244	253	353	213	947	1311	1375	6	9		2	-	2
12		4	2		2	237	208	356	239	1571	879	865	3	4	3	2	1	2
85	77	96	10	6	17	570	557	531	198	1991	1868	1087	62	51	61	8	6	17
21	36		3	13	4	570	594	436	331	1654	2300	1013	12	36		3	12	4
21	30	24	5	8	5	256	287	404	274	689	862	2068	13	28	17	5	8	5

FIRE LOSSES FOR CITIES GREATER THAN 100,000

CITY	POPULATION			TOTAL						
	City (Census 1980)	Total Pop'n Prot'd	Years Data	FIRES				LOSS (000)		
				Y1	Y2	Y3	Rate	Y1	Y2	Y3
	1	2	3	4	5	6	7	8	9	10
VIRGINIA										
Norfolk	266 979	"	1 0 8	2726	2778	2591	1011			
Virginia Beach	262 199	"	1+0+9	3167	3080	2905	1143	3569	5084	4826
Richmond	219 214	"	1+0+9	2846	3167	3091	1384	4118	6784	3091
Newport News	144 903	"	1+	2167			1495	2880		
Hampton	122 617	"	1 8 7	1171	991	1439	979	1822	1100	1476
Chesapeake	114 486	"	1+0 9	1546	1352	1477	1274	1689		1347
Portsmouth	104 577	"	1 9 8	1239	1420	1317	1267	1457	1376	
Alexandria	103 217	"	1 0 8	828	857	904	836	3670	1037	2064
Roanoke	100 220	"	0 9 8	1399	1450	1360	1400	3771		
KENTUCKY										
Louisville	298 451	"	0 9 8	4372	4488	4655	1509			
Lexington-Fayette	204 165	"	1+0+9	4363	3908	2793	1806	4900	4200	2500
TENNESSEE										
Memphis	646 356	"	1 0 8			13962	2160	16877	21135	15890
Nashville-Davidson	455 651	"	0 9 7	5645		5334	1205			
Knoxville	183 139	"	1+0+9	2094	2246	2123	1176	3460	5469	
Chattanooga	169 565	"	1+0+9	4448	4638	4292	2630			
NORTH CAROLINA										
Charlotte	314 447	"	1 9 8	3627	3126	2824	1015	7516	8195	6654
Greensboro	155 642	"	1 0 9	1447	1324	1173	845	2779	2453	2845
Raleigh	149 771	"	1 0 9		1889		1261	1418	3123	
Winston-Salem	131 885	"	1 0 9	1898	1575	1327	1213	9059	5241	3500
Durham	100 831	"	1+0+9	1089	1126	1126	1104	1765	1869	3247
SOUTH CAROLINA										
Columbia	101 208	300000	1+0+9	3482	3066	3327	1097			
GEORGIA										
Atlanta	425 022	"	1+0+9	6020	6055	6062	1422	19487	12404	14812
Columbus	169 441	"	1+0 9	2030	1825	1825	1113	3917	1781	1904
Savannah	141 390	"	1+0+9	1780	1571	1679	1186	4268	2282	4174
Macon	116 896	150815	1 7	2767	2412		1717		4095	
ALABAMA										
Birmingham	284 413	"	1+0+9	4190	3780	3619	1358	12930	8712	8132
Mobile	200 452	"	1+0+9	3560	3303	3489	1721		2373	
Montgomery	178 157	"	0 9 7	1531		1719	912	2661	2713	2243
Huntsville	142 513	"	1 9 7	1406	1530	1786	1104	4225		
MISSISSIPPI										
Jackson	202 895	"	1+0+9	3965	2655	2809	1549	5068	6429	4102
LOUISIANA										
New Orleans	557 482	"	1+0+9	5918	5178	5479	991	14046	42926	19474
Baton Rouge	219 486	"	1+0 9		1499	1552	695	7737	4358	3970
Shreveport	205 815	"	1 0 9	2871	3047		144	7164	3303	
ARKANSAS										
Little Rock	158 461	"	1 0 9	2492			1573		8453	3876
OKLAHOMA										
Oklahoma City	410 251	"	0 9 8	6962			1697	16804		
Tulsa	360 919	"	1 9 8	3685	6848	6618	1584	12393		7796
FLORIDA										
Jacksonville	540 920	"	1+0+9	7105	5965	6063	1179		8067	8749
Miami	346 865	"	1+0 9	1773	1763	3123	640	10599	10640	8872
Tampa	271 523	"	1 0 9	3865	3039	2907	1204	7352	6396	5060
St. Petersburg	238 647	"	1+0+9	2031	1917	2232	863	3068	2247	3138
Fort Lauderdale	153 279	"	1 0 8	1576		1339	951	6981		2651
Hialeah	145 254		1+0 9	896	858	870	602	1166	1529	793
Orlando	128 291	"	1+0 9	1888	1517	1270	1215	1673	1955	1062
Hollywood	121 323	"	1"0 9	723	1033	1046	770	4864	2352	1185

POPULATION (SOUTH REGION)

						TOTAL RESIDENTIAL											
INJURIES			DEATH			FIRES				LOSS (000)			INJURIES			DEATHS		
Y1	Y2	Y3	Y1	Y2	Y3	Y1	Y2	Y3	Rate	Y1	Y2	Y3	Y1	Y2	Y3	Y1	Y2	Y3
11	12	13	4	5	6	33	34	35	36	37	38	39	40	41	42	43	44	45
36	44	80	11	10	12	800	797	690	286				36	40		8	10	
53	46	64	1	4	9	611	579	615	225	2808	2277	2877				1	4	9
72	50	81	20	15	16	879	1191	1089	480	1722		1016	21	50	34	20	15	16
			6															
21	5	12	1	10	4	295	246	252	216	1065	651	619	18	5	12	1	4	4
20	30	25	3	2	2	390	278	412	314	813	819		18			2		
21	36	20	5	8	5	530	524	389	460	926	1253	340	21	36	16	4	6	5
	38	22	-	-	3	158	167	218	175	735	7398	885		38	22	-	-	3
			3	4	4	175	203	416	264							2	3	3
148	110	168	14	6	15	1491	1293	1466	475				134	105		13	5	13
48	29	46	4	-	10													
	83	177		20	20									54	112		17	20
		12	7		18	670	644	740	150	5301	4164	3452		13	7	7	11	14
15	27	27	1	7	4	323	346	382	191									
24	22	18	7	7	4	514	423	606	303				20	15	15	6	6	4
	52	67	11	7	12	785	880	774	259	2963	2264					10	6	11
25	22	26	10	1	2	368	246	239	183	1668	1253	1254	22	18	20	8	1	2
8			4	-	2		747	534	178		1949	1353	6			3	-	2
27	30	29	5	5	5	495	376	322	302	1979	4217	1456	27	22	24	5	5	5
65	60	76	6	5	6	312	353	374	343	850	676	1407	35	49	64	4	4	3
63	57	52	8	9	4													
135	103	134	31	32	26	1209	1316	1394	307	10807	6377	10817	63	49	106	27	25	23
86	28	27	5	8	5	489	545	594	321	1532	1450	1402	65	24	27	5	8	5
			6	4	5	457	484	498	339	1387	943	1431				6	4	5
	6		13	18		741	741		491	2292	2291		6	6			17	
34	34	34	18	26	30								23				25	
			7	10	4	566	635		300	1765	1314					3	8	
22	35	52	3	4	8	417	386	487	241	1171	969		13	35		2	4	
16	10	17	10	5	5	649	563	556	414				10	8	17	3	5	5
16	6	2	10	8	7	909	808	740	404				16	6	2	10	8	7
91	107	48	25	24	19	1961	1740	1468	309	5923	5210	14351	63	74	45	20	23	15
19	29	18	6	3	6	380	364	366	169	4541	2357	2026		14	10	6	3	5
			6	8		980	829	730	411	2598	2114	1138			24	6	8	4
			4	8	7	803	686		470								7	
			19	20	23	1371		1130	305	476	5592					17	19	21
68	16	14	15	11	15	897	1368	2115	405	6685		5778	40	12	14	14	11	15
58	53	76	9	24	27	1276	1081	1418	233	6725	4784	4209		53			23	
87	105	74	14	8	9	686	659	777	204	1731	1227	1010	45	45	44	10	6	7
35	34	17	15	11	11	535	480	500	186	3166	2109	2076	28	21	15	14	11	9
57	38	59	10	4	4	480	626	698	252	1572	1709	1614	39	33	42	9	4	4
61		88	6	1	-	389		371	248	2285		712	44		61		-	-
21	17	44	-	-	1	233	244	283	174	427	418	305	15	7	36	-	-	-
30	50	31	5	3	2	457	467	219	297	869	1213	534	20	50	31	5	3	2
42	26	35	5	-	2	118	287	288	190	895	770	598	26	15	24	5	-	2

FIRE LOSSES FOR CITIES GREATER THAN 100,000

CITY	POPULATION		Years Data	TOTAL						
	City (Census 1980)	Total Pop'n Prot'd		FIRES				LOSS (000)		
				Y1	Y2	Y3	Rate	Y1	Y2	Y3
	1	2	3	4	5	6	7	8	9	10
TEXAS										
Houston	1595 138	-	1+0+8	14344	13773	13836	877	53942	28590	61512
Dallas	904 078	-	1+0+9	10240			1133			
San Antonio	785 880	-	1+0+9	9538	11449	10765	1348	9436	14825	17426
El Paso	425 259	-	1 0 9	4239	3565		918			1469
Fort Worth	385 164	-	1 0 9	6738	9356	5285	1850		13759	
Austin	349 496	-	1 0 8	2790	3740	7522	1356	5277		3909
Corpus Christi	231 999	-	1+0+9	2495	2895	3009	1207			2144
Lubbock	173 979	-	1+0+9	2676	3141	3126	1713	1655	1258	1027
Arlington	160 113	-	1 0 9	1410	1851		1018	5796	2223	5556
Amarillo	149 230	-	1 0 9	1470	1867	1619	1107			
Garland	138 857	-	1 0 9	1889	2186	1886	1431	2889	3219	1967
Beaumont	118 102	-	1 0 9	1699	1674	1591	1401	3237	1306	1946
Pasadena	112 560									
Irving	109 943	-	0 8 7	1358	1362	1321	1225	6321		1889
Waco	101 261	-	7	1048			1035			
NEW MEXICO										
Albuquerque	331 767	-	0 9 8	5043	3925	3817	1285	5416	2954	4228
ARIZONA										
Phoenix	789 704	-	9 8		19076		2416	18817	6625	
Tucson	330 537	-	1+0+9	3895	3549	4732	1228	7360	6205	6238
Mesa	152 453	-	0	1157			759	1039		
Tempe	106 743	-	Ī+0+9	1068	1212	1403	1150	1524	3244	2477
IDAHO										
Boise City	102 451	-	1 0 9	693	729	674	682	1242	978	
NEVADA										
Las Vegas	164 674	-	9 8 7	3019	1980	2325	1483			7822
Reno	100 756	-	1+0+9	1209	1241	1152	1192	1600	4100	2470
UTAH										
Salt Lake City	163 033	-	1 0 9	1476	1965	1755	1062	2738	2675	8528
COLORADO										
Denver	492 365	-	1"0+9	6941	7565	6836	1444	4171	4675	5534
Colorado Springs	215 150	-	1+0+9	2041	1714		873	2684	2276	
Aurora	158 588	-	1+0+9	996	966	1119	648	1519	1677	1720
Lakewood	112 860	-	1 0 9	681	564	489	512	1542	1206	431
Pueblo	101 686	-	1 0 9	1091	1142	1016	1065	891	766	827
WASHINGTON										
Seattle	493 846	-	1 0 9	3952	3509	4382	799	7719	9359	8818
Spokane	171 300	-	1"0+9	1617	2982	3223	2417	5282	3626	6016
Tacoma	158 501	-	9 7		2082		1314	6490	3394	
OREGON										
Portland	366 383	373285	1"0"7	3180	3464	3227	881	9754	13071	7648
Eugene	105 624	122079	1"0"9	589	985		645	1833	1226	
ALASKA										
Anchorage	174 431	210000	1+0 9	1311	1187	1306	604	5584	3654	13038
HAWAII										
Honolulu	762 874	-	1 0 9		8749	9721	1211			

POPULATION (WEST REGION, EXCEPT CALIFORNIA)

INJURIES			DEATH			TOTAL RESIDENTIAL												
						FIRES				LOSS (000)			INJURIES			DEATHS		
Y1	Y2	Y3	Y1	Y2	Y3	Y1	Y2	Y3	Rate	Y1	Y2	Y3	Y1	Y2	Y3	Y1	Y2	Y3
11	12	13	14	15	16	33	34	35	36	37	38	39	40	41	42	43	44	45
319	126	164	43	39	68	3938	3823	3423	234	15570	21600	26839	214	121	126	42	33	57
			31	24	34	2231			247	17123						28		
80	95		17	18	13	1636	2130	2307	258	4326	6011	3347	70	35		11	12	10
52	72	57	4	2	12	528	578	496	126	654	965	712	27	53	37	4	1	12
56	53		22	14	2	952	1795	1080	331	5244	7328	5210	42			17	12	2
19	34	33	3	5	1	326	424	406	112	2871	2314	1726	19	31	12	3	4	1
13	13	25	3	5	4	792	814	769	341	800	856	997	13	16	23	3	4	4
27	33	30	6	6	8	474	605	562	314				25	10	25	5	1	7
25	39	4	2	2	34	272	273	278	171	3905	1706	1421	15	39	2	1	2	23
9	14		8	3		362	393	329	227		2424	1225	8	14		7	3	
		2	-	3	4	253	278	304	200	1309	1418	1584	-	-	2	-	2	4
42	49	32	10	4	3	467	542	438	408	1196	379	389	28	29	19	10	4	3
	44	27	2	5	1	245	157	195	181	2417	938	880				1		1
6			2															
46	41	46	4	3	3	457	488	957	191	2959	1368	2083	46	41	46	4	1	3
109	70		13	15			2502		317		3634						13	
78	60	70	8	7	7	930	891	982	283	2872	2038	2248	67	32	58	7	6	4
6			-			134			88	390			-			-		
	10		-	1	2	112	130	172	129	729	992	1812		10		-	1	2
17	9		2	1	2	170	189	192	179	650	518	963	17	5		2	1	1
30	40		-	10		363	350	420	229	1833		2423	16			-	6	
18	29	39	4	4	2	508		343	422									
30	40	51	6	14	6	232	208	253	142	881	1100	2700	32	36		6	14	6
269	221	209	16	9	13	1259	1512	1505	289	1532	2547	2153	167	172	158	15	8	8
26	21		-	3	2		380	295	157			960					3	1
42	23	35	-	-	4	281	224	329	175	831	621	1352	41	24	28	-	-	4
3	3	11	2	-	1	65	129	68	77	1142	271	190	3	3	11	2	-	1
-	13	-	-	3	-	340	301	232	293	589	602	432	-	-	6	-	2	-
124	111	153	17	26	12	1391	1066	1091	239	3588	4785	4507	83	82		13	25	10
29			3	3	-	641	1174	1245	595	1819			21				3	
61	25		4	3		384	385		243	2224	1148					4	3	
73	72	72	15	12	14	836	1012		248					50		13	12	
7	9		4	3		191	132	171	135	642	499	298	3	8	5	-	2	-
36	42	38	6	2	7	330	330	346	160	2057	2193	3071	35	42	33	6	2	7
		62		9	7			401	53			5005			53		8	

FIRE LOSSES FOR CITIES GREATER THAN 100,000

CITY	POPULATION		Years Data	TOTAL						
				FIRES				LOSS (000)		
	City (Census 1980)	Total Pop'n Prot'd		Y1	Y2	Y3	Rate	Y1	Y2	Y3
	1	2	3	4	5	6	7	8	9	10
CALIFORNIA										
Los Angeles	2966 850	-	1+0+9	29296	31684	33130	1057	86524	55622	
San Diego	875 538	-	1¯0¯9	7125	7557	7923	861	16929	25634	11208
San Francisco	678 974	-	1¯0¯9	7544	8226	8691	1201	19252	18512	19249
San Jose	629 442	700000	1 0 9	4868	4745	5187	705	14633	12056	12627
Long Beach	361 334	-	1 0 9	3583	3923	4610	1118	7226	5765	
Oakland	339 337	-	1¯0 9	4595	4633	4613	1360	15120		18391
Sacramento	275 741	-	1 0 9	6189	4151	7519	2159	8475	7817	6090
Anaheim	219 311	-	1 0 9	2391	2003	1976	968	2874	5263	3241
Fresno	218 202	-	1 0 9	2873	2713	2762	1275	6421	5946	5069
Santa Ana	203 713	-	1 0 9	1528	1657	1698	799	6920	4109	4091
Riverside	170 876	-	1+0+9	1294	1547	1746	895	1820	3226	2797
Huntington Beach	170 505	-	1+0+9	1014	1205	1163	661	1521	2125	2160
Stockton	161 779	-	1+0+9	2072	2124	2048	1287	5726	6082	2956
Glendale	139 060	-	1+0+9	1022	1233	1066	796	1997	4113	3356
Fremont	131 945	-	1+0+9	1061	1236	1061	848	1960	2511	
Torrance	129 881	-	1+0+9	919	902	953	712	1110	790	3552
Garden Grove	123 307	-	0¯9 8	1361	1398	1568	1175	1064	2499	
Pasadena	118 550	-	1 0 9	1252	1161	1232	1025	3544	3073	4182
San Bernardino	117 490	150000	1 0 9	2091	2350	2522	1547	2761		
Oxnard	108 195	-	1¯0 9	932	1098		938	1558	925	
Sunnyvale	106 618	-	1 0 9	735	701	887	726	3445	3252	1199
Modesto	106 602	-	1+0+9	1075	1119	1125	1038	1548	1697	1324
Bakersfield	105 611	-	1+0 9	1616	1608	1628	1531	2154	3202	4724
Berkeley	103 328	-	1+	876			848	3960		
Fullerton	102 034	-	1+0 9	801	866	918	844	1806	1928	

POPULATION (WEST REGION—CALIFORNIA)

						TOTAL RESIDENTIAL															
INJURIES			DEATH			FIRES				LOSS (000)			INJURIES			DEATHS		
Y1	Y2	Y3	Y1	Y2	Y3	Y1	Y2	Y3	Rate	Y1	Y2	Y3	Y1	Y2	Y3	Y1	Y2	Y3
11	12	13	14	15	16	33	34	35	36	37	38	39	40	41	42	43	44	45
266	272		73		89	5105	5169	5584	178	36714	19226		177	151	148	47		
116	148		7	17		1229	1675	1889	182	8020	13662	6084	91	93	127	7	12	8
	58		28	12	33	2189	2363	2366	340	28723	11406	22357		32		24	7	28
92	92	118	11	7	25	869	1035	1637	169	8572	6815	7806	58	71	82	9	3	20
14	36	33	4	9	14	909	916	1455	303	2604	2160	1207	11	17	20	4	2	3
		86	14		17	1381	1410	1567	428	6531	5434	4309	25	47	45	10	5	11
33	32	36	6	8	15		872	904	322		3727	2899		25	31		8	12
	11	6	4	1	1	268	310	354	142	1415	1679	1110	31	8	6	4	1	1
44	85	49	-	10	10	652	644	548	282	2945	2155	2284	36	27	36	2	9	8
44	47	76	3	2	7	330	379	314	167	1308	1501	1233	23	28	49			4
13	19	21	5	1	3	333	377	434	223	1254	1818	970	10	8	9	4	2	1
11	11	25	1	1	7	151	194	184	103	930	917	921	4	7	15	-	-	6
9	24		2	4		413	363	343	231	2360	1879	1423	9	15	7	2	3	2
15	33	25	-	3	3	171	260	265	167	1196	1240	805	8	13	16		2	1
39	24		5	2		257	236	275	194	1046	867	526	17	14	16	1		2
	11	18	1	1	3	106	236	251	152	781	384	307		9	12	1	-	-
13	20	4	2	-	3	192	469	503	315	831	1595	1180	8	22	4			3
20	21	5	-	5	1	375	367	506	351	2297	1922	635		11	5	-	3	1
15	18	19	4	7	-	452		316	256	1423		1050		18	10	2	6	-
7	1		2	-		120	146	157	130	190	474	353	6	1	-	2	-	-
11	11	24	-	2	1	155	174	189	162	783	1056	483	3	6	14	-	1	-
24	22	28	4	1	1	282	302	272	268	582	775	938	16	17	19	3	1	1
6	15	10	3	2	1	295	266	315	276	1088	1220	2165	6	13	10	3	2	1
33			-			287			278	1739			9			-		
4	2		-	-		138		116	124	922		452			1	-		-

Arson Facts

ESTIMATES OF U.S. FIRES DUE TO INCENDIARY AND SUSPICIOUS FIRES IN STRUCTURES (1977-81)

	Number of Fires				
Types of Fires	1977	1978	1979	1980	1981
Structure Fire of Incendiary Origin	86,500	87,000	88,500	92,000	88,000
Structure Fire of Suspicious Origin	81,000	73,000	60,000	54,000	66,500
Total Structure Fire of Incendiary and Suspicious Origin	167,500	160,000	148,500	146,000	154,500

The estimates are based on data reported to the NFPA by fire departments that responded to the NFPA's Annual Survey of Fire Departments for U.S. Fire Experiences (1977-81).

ESTIMATES OF U.S. CIVILIAN DEATHS DUE TO INCENDIARY AND SUSPICIOUS FIRES IN STRUCTURES (1977-81)

	Civilian Deaths				
Types of Fires	1977	1978	1979	1980	1981
Structure Fire of Incendiary Origin	480	520	435	590	555
Structure Fire of Suspicious Origin	155	410	240	180	265
Total Structure Fire of Incendiary and Suspicious Origin	635	930	675	770	820

The estimates are based on data reported to the NFPA by fire departments that responded to the NFPA's Annual Survey of Fire Departments for U.S. Fire Experiences (1977-81).

WE WANT TO KNOW . . .
if a name, an address, or a phone number has changed; if there's an upcoming event, a new program or course, a new publication being offered. If you have more current information than is contained in this *Almanac*, know something that should be included in this book, or just have something interesting about the fire protection scene that you want to contribute, please let us know. Write: Editor, *Fire Almanac*, NFPA, Batterymarch Park, Quincy, MA 02269. All suggestions will receive our careful attention.

ESTIMATES OF U.S. PROPERTY LOSS DUE TO INCENDIARY AND SUSPICIOUS FIRES IN STRUCTURES (1977-81)

	Property Loss				
Types of Fires	1977	1978	1979	1980	1981
Structure Fire of Incendiary Origin	$ 636,000,000	$ 650,000,000	$ 787,000,000	$1,158,000,000	$1,142,000,000
Structure Fire of Suspicious Origin	$ 384,000,000	$ 417,000,000	$ 541,000,000	$ 602,000,000	$ 516,000,000
Total Structure Fire of Incendiary and Suspicious Origin	$1,020,000,000	$1,067,000,000	$1,328,000,000	$1,760,000,000	$1,658,000,000

The estimates are based on data reported to the NFPA by fire departments that responded to the NFPA's Annual Survey of Fire Departments for U.S. Fire Experience (1977-81).

Dollar loss figures represent direct property loss only (loss to contents, structure, a vehicle, machinery, vegetation, or anything else involved in a fire), and do not include indirect losses (e.g., business interruption or temporary shelter costs). Dollar loss estimates are based on figures reported by departments for a year, and no adjustments were made for inflation over the five year period.

Causes of Fire Incidents — 1981

The estimates of cause of fire incidents in this section are based on data reported to the Federal Emergency Management Agency (FEMA) in its National Fire Incident Reporting System (NFIRS). (For a discussion of fire cause where a fatality occurred or where large property loss occurred, see sections on "Ignition Scenarios of One- and Two-Fatality Fires and Profiles of Fire Victims," "Multiple Death Fires," and "Large Loss Fires.") NFIRS 1981 fire incident causal estimates in this section are based on data reported by fire departments from 32 states which participate in the NFIRS system.

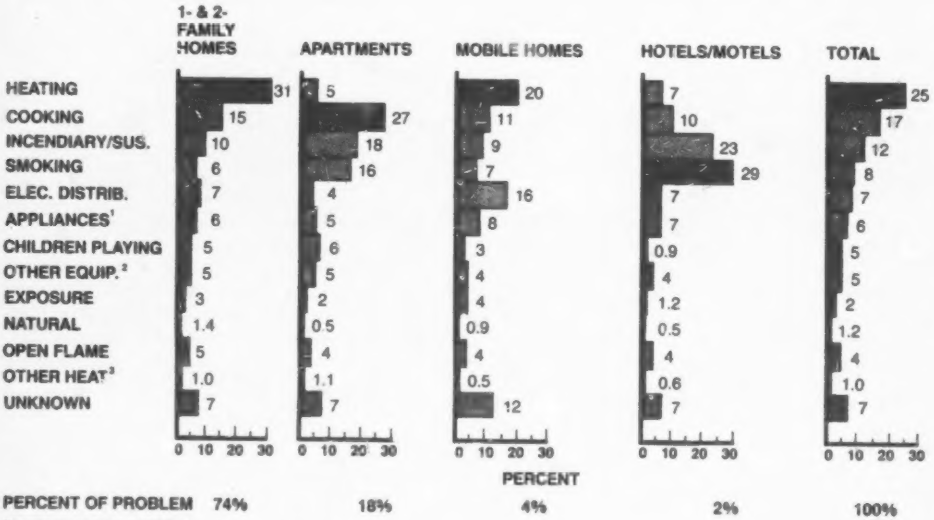
Fire cause categories used by FEMA summarize three data elements (form of heat of ignition, equipment involved in ignition, and ignition factor) specified in NFPA 901, *Uniform Coding for Fire Protection*, and reported in NFIRS data. There are four exceptions to the general rule that FEMA cause categories follow NFPA 901. These are: 1) the "Appliance" category includes air conditioners; 2) the "Other Equipment" category includes special processing, and service equipment; 3) the "Open Flame" category includes torches; and 4) the "Other Heat" category includes all remaining known categories (other than smoking) not involving equipment. (For further details about FEMA cause categories, see *Fire in the United States*, second edition, U.S. Government Printing Office, 1982, p. 15.)

The results presented here are based on cause of fire incidents by occupancy type. The identification of leading fire cause categories by occupancy type can lead to more effective planning for fire inspection and prevention efforts.

During the 1880s, fire fighters developed ways to expedite their arrivals to fires. One "time saving" idea was training horses to move from their stalls at the sound of an alarm, position themselves in front of the engines, wait for the harnesses to drop down on their backs, and charge out of the station to the fire. Tales are told of horses who learned to count the alarms or were so anxious to get to the fire that they charged out of the station leaving the engines behind.

Causes of Fires in Residential Occupancies

FEMA estimates of the causes of 1981 fires in residential occupancies[1] are displayed in the figure shown below. The leading causes of fire in one- and two-family dwellings were heating (31 percent), cooking (15 percent), and incendiary or suspicious (10 percent).



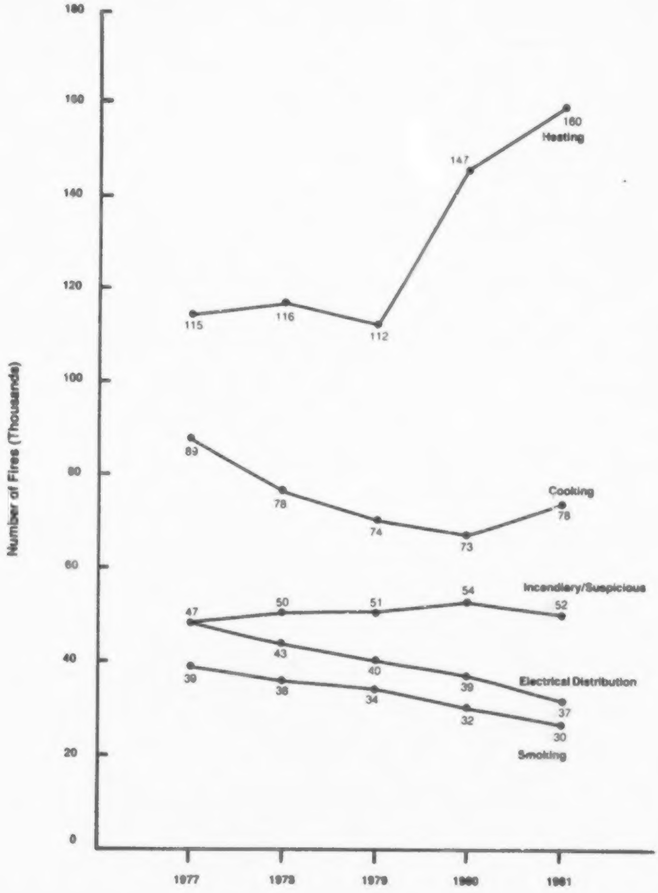
The estimates are based on NFIRS data.

[1] Includes all items listed as appliances in NFPA 901, along with air conditioners.

[2] Includes special equipment, processing equipment, and service or maintenance equipment.

[3] Includes rekindled fire, fireworks, explosives, heat or spark from friction, molten or hot material, and other heat from a spark or hot object.

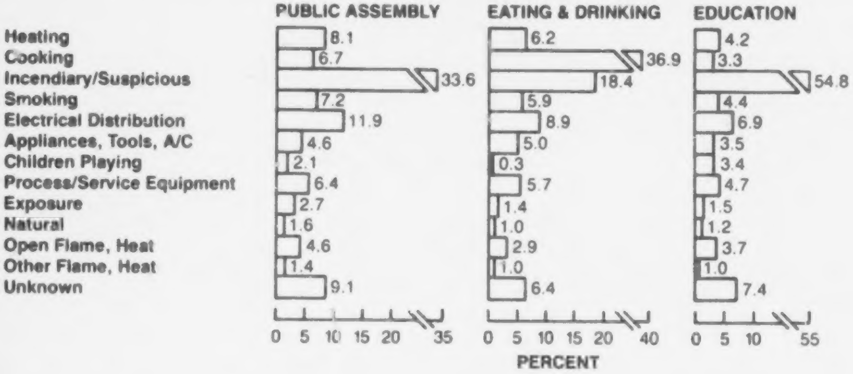
The graph below displays selected causes of fires in one- and two-family dwellings (1977-81).[2] It shows that heating and cooking fires dominate as the leading causes of fires in one- and two-family dwellings over the five-year period. Heating fires in particular increased considerably in 1980 and 1981.

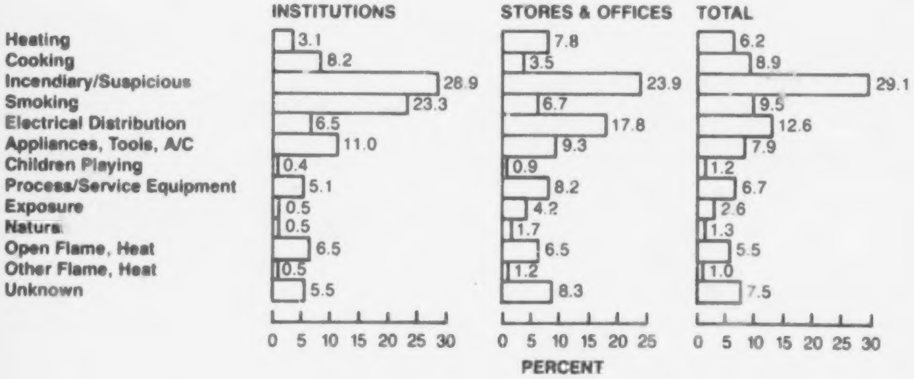


Based on FEMA analysis of NFPA's National Fire Experience Survey and NFIRS data.

Causes of Fires in Public-Mercantile Occupancies (1981)

FEMA estimates of the causes of 1981 fires in public-mercantile occupancies[3] are displayed below. Overall, incendiary or suspicious was the leading cause of fires in public-mercantile occupancies, accounting for 29.1 percent of all fires. Because the leading causes vary somewhat by property type, a different emphasis in fire inspection and prevention programs is needed for each property type.

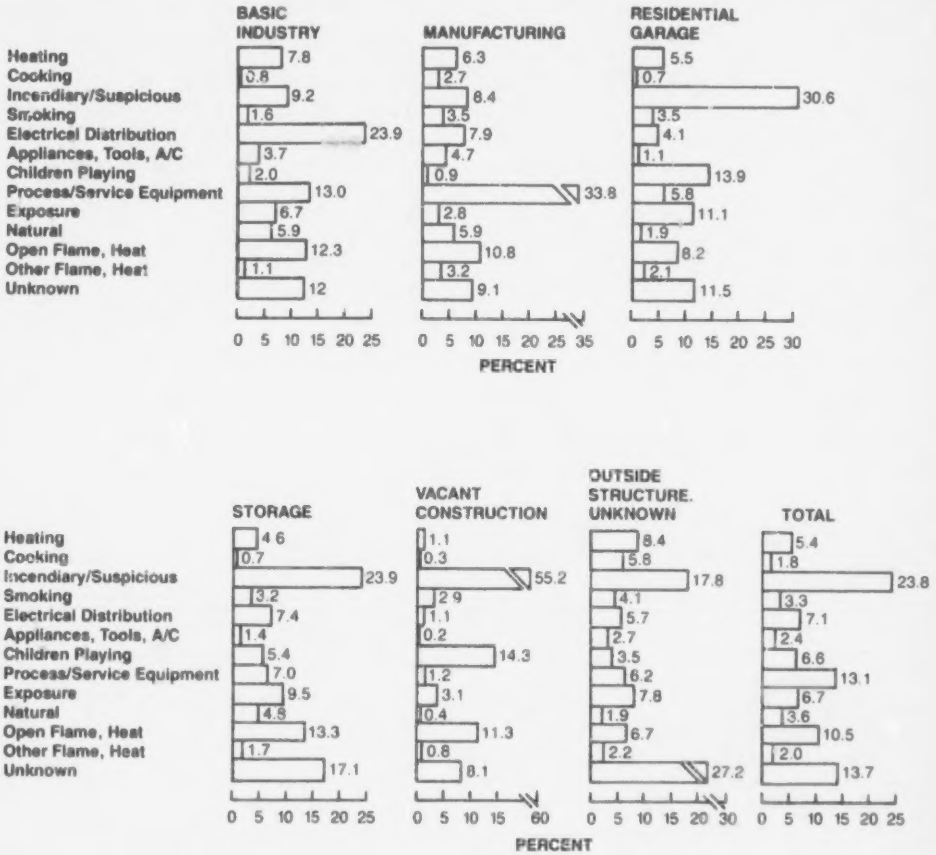




Source: FEMA—Based on 1981 NFIRS data (26,504 fires reported with 2,831 in Public Assembly; 5,037 in Eating, Drinking; 3,089 in Education; 5,015 in Institutions; 10,532 in Stores and Offices).

Causes of Fires in Industrial Occupancies (1981)

FEMA estimates of the causes of 1981 fires in industrial occupancies[4] are displayed in the graph below. Because the leading fire causes vary somewhat by property type, a different emphasis in fire inspection and prevention programs is needed for each property type.



Source: FEMA—Based on 1981 NFIRS data (40,168 fires reported with 2,046 in Basic Industry; 6,741 in Manufacuring; 8,633 in Residential Garage; 9,7[illegible]9 in Storage; 6,749 in Vacant, Construction; and 6,240 in Outside Structure, Unknown).

References

[1] *Fire in the United States* (4th edition), Federal Emergency Management Agency, Washington DC 20472, p. 10. Also in condensed version of report published as "A FEMA View of the 1981 U.S. Fire Problem," *Fire Journal*, Vol. 76, No. 6 (November 1982), p. 34.

[2] *Ibid.*, p. 14. Also in *Fire Journal*, Vol. 76, No. 6 (November 1982), p. 40.

[3] *Ibid.*, p. A8 (adapted from Table 7).

[4] *Ibid.*, p. A12 (adapted from Table 8).

Definitions

Area of origin: The specific use of the area within the property where the fire originated.

Civilian: The term "civilian" includes anyone other than a fire fighter, and covers public service personnel such as police officers, civil defense staff, non-fire fighter medical personnel, and utility company employees.

Death: An injury that occurred as a direct result of a fire and that is fatal or becomes fatal within one year.

Direct property loss: Figures include only direct property damage to the physical structure and contents. Figures do not include indirect losses such as business interruption or temporary shelter provisions.

FIDO: The NFPA designed and operates the Fire Incident Data Organization (FIDO) System, a computerized data base which contains detailed information on individual fires of high technical interest. These fires include the more severe fires, particularly fatal fires, that occur throughout the United States for which the NFPA can obtain technical information. The FIDO System has been in operation since 1971 and contains approximately 50,000 fires added at a rate of 5,000 fires per year. Upon notification of a fire meeting FIDO inclusion criteria, the NFPA seeks additional information primarily from the public fire service. Other data from insurance sources, private fire brigades, and fire investigations (conducted by the NFPA, fire service, and other state and federal agencies) supplement fire department records. The data collected include information on detection and alarm (date, time, location, method of detection, performance of automatic detection systems); origin and development (area of origin, ignition source, material ignited, and other details of the ignition sequence, extent of fire spread); building construction; performance of automatic suppression systems; casualties; and value of direct property damage. Coding of data is guided by NFPA 901, *Uniform Coding for Fire Protection*. FIDO serves as the data base source for the annual multiple-death and large-loss studies as well as ignition scenario analyses.

Fire: Includes combustion explosions and fires that are out on arrival. Excludes controlled burning (whether authorized or not), overpressure rupture without combustion, mutual aid responses, smoke scares, and hazardous responses (e.g., oil spill without fire). In the case of an extension of a fire to exposed properties, the term includes just one fire, including all associated casualties and property loss.

Fire department: May provide fire prevention, fire extinguishment, and emergency rescue service in a given jurisdiction such as a county, municipality, or organized fire district. This excludes private fire brigades and departments that protect military installations.

Heat of ignition: The heat energy which brings about ignition.

Ignition factor: The condition or situation that allowed a heat source and a combustible material to combine to initiate a fire.

Incendiary: Legal decision or physical evidence indicates that a fire was deliberately set.

Injury: Physical damage suffered by a person that requires (or should require) treatment by a practitioner of medicine within one year after the incident (regardless of whether treatment was actually received), or results in at least one day of restricted activity immediately following the incident. (Standard NFPA definition.) Examples of injuries resulting from fire are: smoke inhalation, burns, wounds, fractures, heart attack (resulting from stress under fire conditions), shock, strains, and sprains. The cause of injury may include: exposure to fire products, structural collapse, exposure to chemicals or radiation, stress under fire conditions, falls, being struck by object, or coming into contact with object.

Large-loss fire: A fire that resulted in a considerable direct property damage loss. Because of the effects of inflation, the NFPA in its 1980 large-loss report redefined a large-loss fire as one that caused $1 million or more in direct property damage.

Material first ignited: The combustible that is first set on fire by the heat of ignition.

Multiple-death fire: A fire that killed 3 or more people.

National Fire Experience Survey: The NFPA annually conducts a sample survey of fire departments in the United States to estimate the national fire experience. Based on the survey responses, the NFPA publishes in its annual U.S. fire experience report national estimates that include the following:

1. Overall number of fires and resulting deaths, injuries, and direct property losses.
2. Frequency of incendiary and suspicious structure fires and the resulting deaths and direct property damage.
3. Number of deaths and direct property losses for major property uses.

The annual fire experience report also includes year to year comparisons that indicate whether the fire problem is getting better or worse. The national fire experience survey also includes questions on nonfatal fire fighter injuries, and serves as the basis of the annual fire fighter injury report.

Property Use: The use to which a property is put. A building for example, could serve as a garage or a department store. The use of property does not define any of the other important fire-related details of property such as access, ownership, size, internal weakness in fire defense, or construction.

Region of the country: The four regions as defined by the U.S. Census Bureau include the following states:

Northeast: Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont.

Northcentral: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.

South: Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia.

West: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

Structure: An assembly of materials forming a construction for occupancy or use in such a manner as to serve a specific purpose. A building is a form of a structure. Open platforms, bridges, roof assemblies over open storage or process areas, tents, air-supported structures, and grandstands are other forms of structures.

Suspicious: Circumstances indicate the possibility that a fire may have been deliberately set, multiple ignitions were found, or there were suspicious circumstances and no accidental or natural ignition factor could be found.

Type of duty for fire fighters: *responding to or returning from an incident* (includes fire and non-fire emergencies); *fireground* (all activities from the moment of arrival to departure time, e.g., extinguishment, overhaul); *at a non-fire emergency* (includes rescue calls, hazardous condition calls-spills, natural disaster calls, etc.) *training; other on duty* (including inspection and maintenance duties).

Vehicles: Includes highway vehicles, trains, boats, ships, aircraft, farm vehicles, and construction vehicles.

Significant Historical Fires

FAMOUS FIRES IN PLACES OF PUBLIC ASSEMBLY (1900-1982)

Date	Location	Number of Deaths
Jan. 12, 1903	Rhoades Opera House, Boyertown, PA	170
Dec. 30, 1903	Iroquois Theater, Chicago, IL	602
Nov. 22, 1919	Dance Hall, Ville Platte, LA	25
Apr. 23, 1940	Rhythm Club, Natchez, MS	207
Nov. 28, 1942	Cocoanut Grove (night club), Boston, MA	492
July 6, 1944	The Ringling Brothers and Barnum and Bailey Circus, Hartford, CT	168
Jan. 29, 1956	Amusement Hall, Arundel Park, MD	11
Oct. 10, 1963	Indiana State Fairgrounds Coliseum, Indianapolis, IN	74
Feb. 7. 1967	Dale's Penthouse (restaurant), Montgomery, AL	25
June 24, 1973	The Upstairs Lounge, New Orleans, LA	32
June 30, 1974	Gulliver's Discotheque, Port Chester, NY	34
Dec. 29, 1975	Airport Terminal building, Brooklyn, NY (bomb explosion)	13
Oct. 24, 1976	The Puerto Rican Social Club, Bronx, NY	25
May 28, 1977	Beverly Hills Supper Club, Southgate, KY	165
Dec. 4, 1980	Conference Center in Stouffer's Inn, Harrison, NY	26

FAMOUS INSTITUTIONAL FIRES

Date	Location	Number of Deaths
May 15, 1929	Cleveland Clinic, Cleveland, OH	125
Apr. 21, 1930	Ohio State Penitentiary, Columbus, OH	320
Apr. 4, 1949	St. Anthony Hospital, Effingham, IL	74
Jan. 7, 1950	Mercy Hospital, Davenport, IA	41
Dec. 8, 1961	Hartford Hospital, Hartford, CT	16
Nov. 23, 1963	Golden Age Nursing Home, Fitchville Township, OH	63
Jan. 9, 1970	Convalescent Home, Marietta, OH	32
Jan. 14, 1971	Nursing Home, Buechel, KY	10
Oct. 19, 1971	Nursing Home, Honesdale, PA	15
June 9, 1975	Jail fire, Sanford, FL	11
Jan. 30, 1976	Nursing Home, Chicago, IL	24
June 26, 1977	County Jail, Columbia, TN	42
Dec. 9, 1978	Institution for Mentally Retarded, Ellisville, MS	15
Dec. 27, 1979	County jail, Lancaster, SC	11
Nov. 8, 1982	Jail fire, Biloxi, MS	29

FAMOUS HOTEL FIRES

Including residential (home) hotels in addition to hotels usually frequented by the traveling public

Date	Location	Number of Deaths
June 5, 1946	The LaSalle Hotel, Chicago, IL	61
Dec. 7, 1946	Winecoff Hotel, Atlanta, GA	119
June 9, 1946	Canfield Hotel, Dubuque, IA	19
Dec. 29, 1963	Roosevelt Hotel, Jacksonville, FL	22
Mar. 20, 1970	Ozark Hotel, Seattle, WA	20
Sept. 13, 1970	Ponet Square Hotel, Los Angeles, CA	19
Dec. 20, 1970	Pioneer Hotel, Tucson, AZ	28
Jan. 16, 1972	Pennsylvania House Hotel, Tyrone, PA	12
Aug. 25, 1974	Washington House Hotel, Berkeley Springs, WV	12
July 7, 1975	Pomona Hotel, Portland, OR	11
Jan. 10, 1976	Pathfinder Hotel, Fremont, NE	20
Jan. 28, 1977	Stratford Hotel, Breckenridge, NM	17
Dec. 10, 1977	Resort Hotel, Bay City, MI	10
Jan. 28, 1978	Coates House Hotel, Kansas City, MO	20
Nov. 5, 1978	Allen Motor Inn, Honesdale, PA	12
Nov. 26, 1978	Holiday Inn, Greece, NY	10
July 31, 1979	Holiday Inn, Cambridge, OH	10
Nov. 21, 1980	MGM Grand Hotel, Las Vegas, NV	85
Mar. 14, 1981	Royal Beach Hotel, Chicago, IL	19
Mar. 6, 1982	Westchase Hilton Hotel, Houston, TX	12
Apr. 30, 1982	Pinter's Home Hotel, Hoboken, NJ	13
Sept. 4, 1982	Dorothy Mae Hotel, Los Angeles, CA	24

FIRES IN BOARDING FACILITIES/HALFWAY HOUSES

Date	Location	Number of Deaths
Apr. 1, 1979	Boarding Home, Connellsville, PA	10
Apr. 2, 1979	Boarding Home, Farmington, MO	25
Apr. 11, 1979	Halfway House, Washington, DC	10
Nov. 11, 1979	Boarding Home, Pioneer, OH	14
July 26, 1980	Boarding Home, Bradley Beach, NJ	24
Jan. 9, 1981	Boarding Facility, Keansburg, NJ	31

Cocoanut Grove
Melody Lounge

Aftermath of the Cocoanut Grove fire in Boston, MA in 1942 where 492 people lost their lives.

FAMOUS FIRES IN INDUSTRY AND COMMERCE

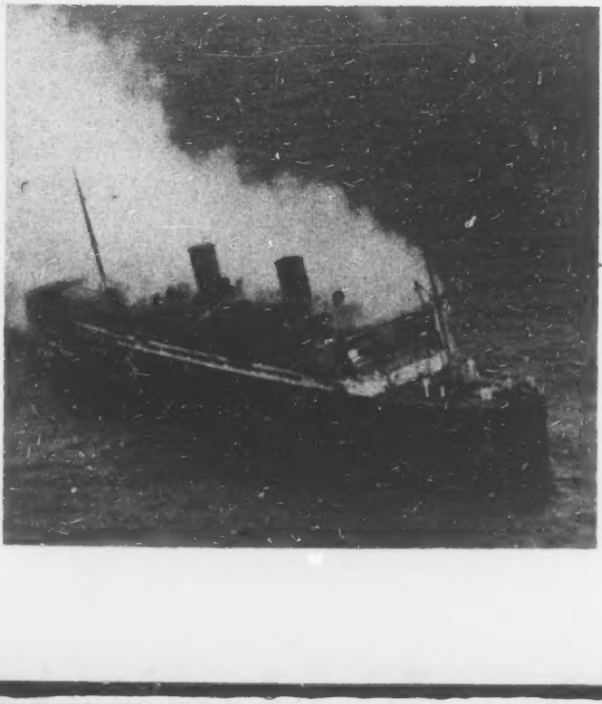
Date	Location	Number of Deaths
	Store and Office	
July 28, 1945	Empire State Building, New York, NY	14
Aug. 10, 1955	Dairy Store, Andover, OH	22
Nov. 17, 1966	Mercantile Building, New York, NY	12
Apr. 5, 1968	Marting Arms (sporting goods store), Richmond, IN	41
Feb. 25, 1969	Office Building, New York, NY	11
Sept. 24, 1972	Ice Cream Parlor, Sacramento, CA	22
Feb. 2, 1973	Department Store, Eagle Grove, IA (natural gas explosion)	14
Dec. 22, 1976	Department Store, Brooklyn, NY	12
Nov. 5, 1978	Department Store, Des Moines, IA	10
	Basic Industry, Utility, Defense	
Mar. 25, 1947	Centralia Coal Co., Centralia, IL	111
Dec. 21, 1951	C.W. & F. Coal Company, W. Frankfort, IL	119
Aug. 9, 1965	Missile Silo, Near Searcy, AR	53
Dec. 30, 1970	Coal Mine Explosion, Hyden, KY	38
May 2, 1972	Silver Mine, Kellogg, ID	91
Mar. 9 & 11, 1976	Coal Mine Explosion, Oven Fork, KY (two blasts)	26
Dec. 8, 1981	Coal Mine, Whitwell, TN	13
	Manufacturing	
Nov. 26, 1910	Factory Building, Newark, NJ	25
Dec. 22, 1910	Nelson Morris Co., Chicago, IL	21
Mar. 25, 1911	Triangle Shirtwaist Co., New York, NY	145
July 22, 1913	Binghamton Clothing Co., Binghamton, NY	35
Apr. 10, 1917	Eddystone Ammunition Corp., Eddystone, PA (explosion)	133
July 29, 1956	Refinery, Sun Ray, TX	19
Jan. 24, 1957	Clothing Factory, New Haven, CT	15
Mar. 19, 1958	Clothing Factory, New York, NY	24
Oct. 4, 1960	Aniline MFG Plant, Kingsport, TN	15
Jan. 2, 1963	Meat Processing Plant, Terre Haute, IN	16
Aug. 25, 1965	Synthetic Rubber MFG, Louisville, KY	12
Feb. 3, 1971	Chemical Plant, Woodbine, GA (violent explosion and fire)	25
Dec. 16, 1972	Steel Plant, Weirton, WV (gas explosion in a coke oven)	21
Aug. 12, 1976	Oil Refinery Explosion, Chalmette, LA	12
July 24, 1980	Metal Products MFG, New York, NY	11
	Storage	
July 17, 1944	Munitions Depot, Port Chicago, CA (explosion)	300
Oct. 20, 1944	East Ohio Gas Co., Cleveland, OH (gas explosion)	136
May 19, 1950	Pier (R.R.) South Amboy, NJ	31
Dec. 22, 1977	Grain elevator explosion, Westwego, LA	36
Dec. 27, 1977	Grain elevator explosion, Galveston, TX	18

FAMOUS FOREST FIRES

Date	Location	Number of Deaths
Oct. 12, 1918	Minnesota	559
Oct. 3, 1933	Los Angeles, CA	28
Oct. 23, 1947	Maine	15
Aug. 7, 1948	Helena, MT	13
July 9, 1953	Alder Springs, CA	15
Nov. 1, 2, 1966	Southern CA	18

FAMOUS MARINE FIRES

Date	Location	Number of Deaths
June 30, 1900	Steamship, Hoboken, NJ	326
June 15, 1904	Excursion Steamer, General Slocum, Hells Gate Passage, East River, New York, NY	1030
Sept. 8, 1934	S.S. Morro Castle, off the New Jersey Coast	125
Apr. 16, 1947	S.S. Grandcamp, Texas City, TX	468
Sept. 9, 1947	Queen Island, Passenger Vessel, Pittsburgh, PA	21
Jan. 17, 1956	S.S. Salem Maritime, Tank Ship, Lake Charles, LA	21
Dec. 19, 1960	U.S.S. Constellation, New York, NY	50
June 6, 1966	Ship Collision, New York, NY	37
Apr. 6, 1969	S.S. Union Faith, Mississippi River at New Orleans, LA	25
Feb. 1, 1972	S.S. V.A. Fogg, Tank Ship, Galveston, TX	39
Apr. 9, 1974	S.S. Elais, Tanker, Tinicum Township, PA	11
Jan. 31, 1975	Ship Collision, Marcus Hook, PA	29
Nov. 5, 1979	Ship Collision, Galveston, TX	32



S.S. Morro Castle in flames off the New Jersey Coast, 1934.

FAMOUS TRANSPORTATION FIRES

Date	Location	Number of Deaths
	Rail	
Sept. 27, 1915	Tank Car, Ardmore, OK	43
July 31, 1940	Train Collision, Cuyahoga Falls, OH	43
May 25, 1950	Street Car-Tank Truck Collision, Chicago, IL	34
June 28, 1959	Tank Car Derailment, Meldrim, GA	23
Mar. 1, 1960	Train-Tank Truck Collision, Bakersfield, CA	14
Dec. 28, 1966	Passenger Train-Tank Truck Collision, Everett, MA	13
July 5, 1973	Tank Car, Kingman, AZ	13
Feb. 24, 1978	Derailment, Waverly, TN	16
	Highway	
Jan. 31, 1936	Prision Transport Van, Scottsboro, LA	20
Mar. 24, 1937	Bus Accident, Salem, IL	20
Aug. 4, 1952	Bus Accident, Waco, TX	28
Mar. 7, 1968	Bus-Auto Accident, Baker, CA	21
Apr. 30, 1975	LP Gas Tank Truck, Eagle Pass, TX	19
June 26, 1981	Converted Bus, San Bernardino, CA	10
	Air (fire deaths only)	
May 6, 1937	Zeppelin, Lakehurst, NJ	36
Mar. 20, 1969	DC-3, Kenner, LA	16
Nov. 28, 1970	DC-8, Anchorage, AK	47
Dec. 8, 1972	Aircraft Crash, Chicago, IL	45
Dec. 20, 1972	DC-9 Crash, Chicago, IL	10
Apr. 4, 1977	DC-9 Crash, New Hope, GA	28

German zeppelin, Hindenburg aflame as it attempts to land at the naval air station in Lakehurst, NJ in 1937. (Wide World Photos)

TRENDS AFFECTING TRANSPORTATION FIRE-SAFETY

The most dynamic current trend in retail gasoline marketing may be the advent and spread of automated dispensing devices that enable consumers to purchase gasoline by using a key or card, and in some cases, even a major credit card. These stations are considered to be "private," in that they are not open to the general public; rather, membership is restricted to those who have cards or keys. These private service stations are not required by the provisions of NFPA 30, *Flammable and Combustible Liquids Code*, to have a responsible person in attendance. The result may be that the service station of the future will be both automated and unattended.

Another development that requires watching is the growth in the number of propane-fueled vehicles on the road. In some cases, vehicles are dual-fueled, so that they can run on either propane or gasoline. Some estimates suggest that there may be as many as one and one-half million vehicles in the United States that are propane-propelled, mostly in fleets, such as taxi companies, school buses, and official municipal cars. Liquid propane occupies only 1/270th of the space that propane in the gaseous state occupies, and a gallon of propane has about 90,000 Btus. Its octane level is on a par with premium leaded gasoline, but cars average approximately 15 percent fewer miles per gallon with propane. However, its cost is substantially less than gasoline, averaging about 75 cents a gallon. There are self-serve propane stations in Europe, and there will certainly be an effort to introduce this type of operation in the United States.

The increasing number of propane-fueled vehicles on the road presents some serious problems for public safety. One problem area concerns the conversion of a vehicle from the use of gasoline to propane. Only authorized individuals should be allowed to make such conversions, and then only in accordance with national standards. A second concern involves the ability to recognize a propane-fueled vehicle, possibly by requiring a standardized symbol to be affixed on the car. During an emergency, responding emergency personnel need to know what type of fuel is involved as soon as possible during the incident.

There will undoubtedly be a growth in the number of service stations that market gasoline, diesel, and propane at the same site. One potential result of this development may be that a single fire code will be created to deal with all types of service stations and include coverage of whatever type of fuel might be dispensed, stored, or handled. (See "Propane Fuel for Cars Stirs Safety Doubts," *Wall Street Journal*, Nov. 23, 1982, p. 35.)

Where to Find Information about Marine Fires

Information about marine fires can be obtained from the following sources.

Commercial Vessels

U. S. Coast Guard

The U. S. Coast Guard investigates all marine casualties within U. S. waters and all marine casualties involving U. S. flag vessels worldwide and issues a report (formal or informal according to the degree of casualty) that outlines the cause of the casualty and contains recommendations for preventing recurrences. The U.S.C.G. also issues an annual summary of vessel casualties in its *Marine Safety Statistical Review*.

Copies of marine casualty reports, the Statistical Review, and the latest computer data may be obtained by writing:

Commandant USCG (G-MA)
U. S. Coast Guard Headquarters
Washington, DC 20590

National Transportation Safety Board

NTSB investigates marine casualties depending on the severity of the casualty. These reports also identify the probable cause of the accident and recommend solutions. Reports can be obtained from the National Transportation Safety Board, Washington, DC 20594. Specify date and place of marine accident and that you want the "Marine Accident Report" for it.

International Chamber of Shipping (ICS)

ICS issues reports on all accidents (worldwide) brought to their attention. They will provide these reports upon request. Write: International Chamber of Shipping, 30-32 St. Mary Avenue, London EC3A8ET, England.

Lloyd's of London

Lloyd's of London issues daily bulletins of vessel casualties around the world. A brief description of the casualty is included. The Casualty Services Branch of Lloyd's of London Press maintains extensive records of casualty information and statistics dating back many years. This information is recorded in a variety of ways and can be made available upon request. For example, the following types of information can be supplied from their Casualty Files:

- Reported casualty histories of named vessels.
- Serious casualties to tanker and OBOs of 50,000 dwt and above since 1968.
- Casualties to vessels in specific geographic areas.
- Casualties categorized by type, e.g., groundings, collisions, fires or explosions, machinery damage.
- Casualties to drilling rigs.
- Marine losses listed by flag.

For further details of services and charges contact:

Norman Hooke
Casualty Records, Intelligence Department
Lloyd's of London Press Ltd.
Sheepen Place
Colchester, Essex CO3 3LP, England
Telephone: (0206) 69222, Extension 242

CAUSES OF RECREATIONAL BOATING ACCIDENTS — 1980

Type of Incident	Total Vessels Involved	Fatalities
TOTALS	6,954	1,360
CAPSIZING, SWAMPING, SINKING, FLOODING		
Load related		
Overloading	62	74
Improper weight distribution	54	35
Standing or sitting on gunwale, bow, transom	6	5
Movement of passengers	27	22
Hoisting or lowering anchor	5	1
Free water in boat		
Water entered vessel over gunwale, bow, or transom	51	6
Water entered vessel through hull	80	5
Miscellaneous		
Force of wake or wave striking vessel	167	23
Loss of stability during high speed maneuver	9	6
Loss of stability in strong current, white water, rapids, etc.	544	189
FIRE, EXPLOSION		
Equipment failure		
Fuel system failure (leaks, etc.)	168	0
Electrical system failure	58	0
Auxiliary equipment failure (stoves, etc.)	13	1
Miscellaneous		
Ignition of spilled fuel or vapor	52	2
Misuse of source of heat (stoves, etc.)	5	0
FALLS OVERBOARD, FALLS WITHIN BOAT		
Falls during sharp turns or acceleration	45	14
Falls due to wave or wake striking vessel	23	3
Falls while moving, standing, or leaning over edge of boat	74	57
Falls while sitting on gunwale, transom, bow, back of seat, etc.	21	12
Falls on slippery surface	5	5
COLLISIONS, GROUNDINGS, STRUCK BY BOAT OR PROPELLER		
Failure to detect hazard		
Improper lookout	861	58
Poor visibility (rain, fog, darkness, etc.)	25	3
View obstructed (bow in air, sun glare, bright lights, etc.)	69	5
Submerged object (logs, rocks, swimmer, diver, etc.)	438	43
Operator inattention or carelessness	942	180
Miscellaneous		
Equipment failure (steering, throttle, etc.)	299	41
Violation of Rules of the Road	162	8
Speeding	258	36
Improper navigation lights	48	1
Starting in gear	1	1
Navigational error	45	1
Other vessel/operator at fault	1,246	28
Strong current, rough waters, etc.	125	62
OTHER	484	87
UNKNOWN	482	346

SOURCE: U.S. Coast Guard 1980 report *Recreational Boating Accidents*.

Recreational Craft

The U. S. Coast Guard issues an annual report on recreational boating accidents. The latest report is for calender year 1980 and covers all boating accidents which occurred on:

1. The waters of the United States under joint or federal jurisdiction.
2. Those waters under exclusive state jurisdiction within a state having an approved numbering system.
3. Those waters under exclusive state jurisdiction within a state not having an approved system for which reports are received.
4. International waters, such as the high seas, for which reports are received.

The U.S. Coast Guard investigates all fatal boating accidents which occur on waters under joint or federal jurisdiction. The findings for each investigation are transmitted to U. S. Coast Guard Headquarters in Washington, DC in a written report which is used in developing the statistics for the annual report.

The statistics in the report are broken down by state and causes of accidents. One of the causes of an accident identified in the report is fire and explosion, which is further broken down into equipment failure (i.e., fuel system failure, electrical system failure. etc.) and miscellaneous (i.e., ignition of spilled fuel or vapors, misuse of source of heat, etc.). The breakdown of the causes of accidents from the 1980 report follows. The complete report can be obtained by writing to Commandant (G-CMA), U. S. Coast Guard, Washington, DC 20593.

Lessons of Famous Shipboard Fires and Explosions

Morro Castle

Description: Cruise ship 508 feet in length, 70 feet wide
11,520 gross tons

Date: September 8, 1934

No. People: 318 passengers
231 crew
135 dead

Area of Origin: Locker in writing room on promenade deck containing approximately 100 blankets that had been cleaned with a flammable substance.

Fire Protection: 42 firemain outlets
portable fire extinguishers
fire hose
smoke detection system in cargo holds
fixed fire extinguishing systems in cargo holds and engine room
automatic fire doors

Most of these safety features were made ineffective by alterations and/or lack of proper training.

Lessons Learned:

1. Crew must be thoroughly trained in emergency procedures.
2. Drills must be held for benefit of crew and passengers.
3. Sprinkler system, or a continuously monitored smoke and fire detection system should be installed throughout passenger vessels. Interior structural members, bulkheads, overheads, and decks should be fire resistive, noncombustible, or fire retardant.

4. Firestops should be installed in horizontal and vertical voids, wherever smoke, heat, and fire can move from one space to another. Ducts should be equipped with dampers.
5. Alarm must be sounded without delay.
6. Fire detection and fire fighting systems should not be altered, removed, or changed to reduce their effectiveness.

Normandie/USS Lafayette

Description: Cruise ship 1,000 feet in length
80,000 gross tons

Date: February 9, 1942

No. People: 1,300 crew

Area of Origin: Grand Salon where sparks from a cutting torch ignited canvas-covered life preservers made of highly flammable kapok.

Fire Protection: 224 fire alarm stations (not working at time of fire)
fire guards with little or no training
fire extinguishers (either empty or with instructions written in French)
hose connections, in process of conversion from French to U.S. hose thread

Lessons Learned:
1. Lines of responsibility for fire protection of commandered vessel need to be clearly defined.
2. Care must be used in directing hose streams onto the upper parts of a ship, as water affects stability of vessel. In this fire, many tons of water were poured on the fire 10 decks above the keel. It could not run off and caused the ship to capsize.
3. Keep repairs requiring hot work to a minimum. Do hot work only under personal supervision of a ship's officer.
4. Greater surveillance and increased fire protection required when ships undergo repairs and alterations.
5. Past fire experiences should be used to preplan fire protection.

Yarmouth Castle

Description: Cruise ship 379 feet in length
5,000 gross tons

Date: November 13, 1965

No. People: 165 crew
376 passengers
87 dead (85 passengers, 2 crewmen)

Area of Origin: Storage room on main deck that contained mattresses, chairs, paneling, and other combustible materials (unsprinklered).

Fire Protection: Portable fire extinguishers
Fire pumps and hoselines

Lessons Learned:
1. Early detection of fire and prompt sounding of alarm essential.
2. Crew must understand why fire prevention necessary.
3. Crew must be trained and drilled in how to function during an emergency and in the use of portable fire extinguishers, hoselines, and breathing apparatus.

4. A smoke detecting and/or sprinkler system required in passenger and crew accommodations.
5. Where feasible, fire resistive, noncombustible, and fire retardant materials should replace combustible interior construction.
6. Master should never leave his ship (as this one did).

MV Alva Cape and SS Texaco Massachusetts

Description: Four separate ship fires (two tankers and two tugboats) that resulted after the tankers collided. The *Massachusetts* had just discharged gasoline and was heading out of port with tug *Latin America* alongside.

The *Alva Cape* was heading into port with 5,579,868 gallons of naphtha in 21 tanks. The tugboat *Vermont* was trying to overtake her.

Date: June 16, 1966

No. People: 39 crew and 2 pilots aboard *Massachusetts*
44 crew aboard *Alva Cape*
33 dead; 64 injured (includes fire fighters)

Area of Origin: Explosions and fires after impact of prow of the Massachusetts with the No. 1 starboard wing tank of the *Alva Cape*. Source of ignition for explosion near *Massachusetts* was most likely caused by the *Latin America* and for the *Alva Cape*, the *Vermont*.

Lessons Learned:

1. Vessels should have communicated via radiotelephone.
2. Precautions against reignition should be taken in fires involving flowing volatile and combustible liquids. Flotation rings, hose streams, emulsifiers, foam blankets can be used for this purpose.
3. Caution, discipline, and close supervision of individuals must be maintained in such situations.
4. Traffic control critical in vicinity of such a fire.
5. Commit only minimum manpower possible in hazardous and potentially explosive situation. To minimize risk to fire fighters, separate fire problem into parts and attack parts on a priority basis.
6. Rotate fire fighters to minimize exposure time.
7. Conduct salvage operations involving vessels carrying flammable products using methods that safeguard against the creation of explosive atmospheres.

MV San Francisco Marie

Description: Cargo ship 511 feet in length
10,087 gross tons

Date: March 30, 1968

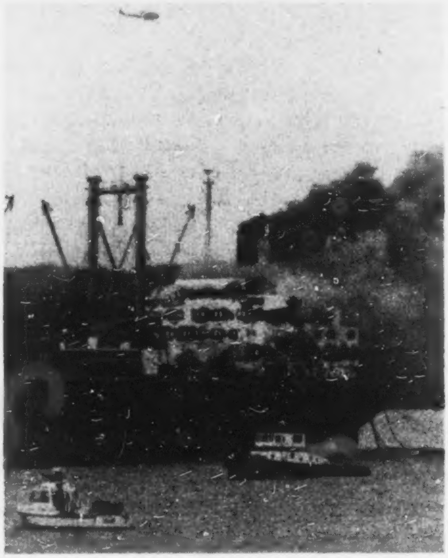
No. People: 34 crew

Area of Origin: Lower hold

Fire Protection: Smoke detecting and CO_2 extinguishing system.

Lessons Learned:

Confirmation of the following, since the fire was successfully contained in the lower hold and extinguished by the CO_2 system, without the use of water.



An early morning explosion and fire aboard this 600-foot German-registered freighter took the life of a Coast Guard fire fighter. The freighter Protector Alpha burst into flames while taking fuel oil at Kalama, WA, 30 miles north of Portland, OR. A Coast Guard fire fighter, three freighter crewmen, and a Seattle fire fighter were injured while fighting the fire. (Jan Fardell photo)

1. Crewmen need to be trained in using CO_2 to extinguish fire. Through training, they gain confidence in the fire protection equipment itself in addition to learning how to use it.
2. Early detection of smoke and/or fire is essential. Therefore, the automatic detection system should always be monitored. In this case, the monitoring cabinet was on the bridge and since the ship was in port, the bridge was unoccupied.
3. To prevent errors under fire conditions, frequent drills should be held with the CO_2 extinguishing system.
4. CO_2 is the safest and most efficient extinguishing agent for hold fires. Water is less effective and may create a stability problem and could damage cargo. CO_2 does not damage cargo.
5. Patience is essential when CO_2 flooding is used to extinguish a hold fire. This fire, which was detected about 5:00 p.m. on Saturday, was not confirmed extinguished until the following Monday morning.

SS Monticello Victory

Description: Tank vessel 736 feet in length
49,229 tons deadweight

Date: May 31, 1981

Area of Origin: Hot work in engine room on bilge discharge line connected by a portable line to a non-gas free cargo tank. An unobstructed path for flame propagation from welding operations to non-gas free tank existed, causing explosion.

Lessons Learned:
1. Failure to provide flame screen protection on Butterworth opening to cargo tank.
2. Open unobstructed line allowed flammable concentrations path from source of vapors to hot work area.

3. Survey by a qualified person should be conducted prior to any hot work on a pipe line.

NOTE: The information for the first five summaries is contained in *Marine Fire Prevention Firefighting and Fire Safety*, available from the Maritime Training Advisory Board of the Maritime Administration. Complete accounts of these incidents and others are included in the report. The information for the last summary is contained in National Transportation Safety Report on *SS Monticello Victory*, HTSB-Mar.-81-14, National Technical Information Service, Springfield, VA 22161.

Marine Casualty Statistics

Each year, the U. S. Coast Guard compiles a statistical summary of commercial vessel casualties investigated by Coast Guard marine inspectors during the previous fiscal year. When commercial vessels sustain any of the following casualties, the master of the vessel is required by law to report the loss, as soon as possible after its occurrence, to the Coast Guard Officer in Charge, Marine Inspection.

1. Actual physical damage to property in excess of $25,000;
2. Material damage affecting the seaworthiness or efficiency of a vessel;
3. Stranding or grounding (with or without damage);
4. Loss of life;
5. Injury causing any person to remain incapacitated for a period in excess of 72 hours, except injury to harbor workers not resulting in death and not resulting from vessel casualty or vessel equipment casualty.

The tables which follow represent fire and explosion casualties to commercial vessels that meet the above criteria. Since the casualty experience for the entire commercial fleet is summarized in these statistical tabulations, the use of the statistics may lead to erroneous conclusions unless the limitations of the data are understood. The Information and Analysis Staff of the Office of Merchant Marine Safety will gladly assist in quantifying those limitations for each specific need. Comments and recommendations for changes or improvements to these statistics should be addressed to the Commandant (G-MA/15), U.S. Coast Guard, Washington, DC 20593.

PERSONNEL DEATHS/INJURIES DUE TO A VESSEL FIRE/ EXPLOSION BY FISCAL YEAR (OCT. TO SEPT.)

Year	Deaths	Injuries
1971	55	79
1972	67	50
1973	4	33
1974	23	30
1975	21	25
1976*	29	46
1977	33	45
1978	18	31

*15 month reporting period

Source: *Marine Safety Statistical Review*, 1979, Department of Transportation, Coast Guard

VESSEL CASUALTIES DUE TO FIRE AND EXPLOSION BY FISCAL YEAR (OCT. TO SEPT.)

Year	No. Casualties
1971	176
1972	170
1973	149
1974	180
1975	206
1976*	285
1977	214
1978	210

*15 month reporting period

Source: *Marine Safety Statistical Review*, 1979, Department of Transportation, Coast Guard

Forest Fires

FOREST ACRES BURNED BY CAUSE — 1978

Causes*	Lightning %	Camp Fires %	Smoking %	Debris Burning %	Incendiary %	Equipment Use %	Railroad %	Children %	Misc. %
United States	21	2	6	16	34	8	3	2	8
Rocky Mountain Group	29	3	4	15	5	19	5	2	18
Pacific Group	58	3	2	6	12	7	1	2	9
North Central Group	14	3	4	20	38	9	6	1	5
Eastern Group	2	3	7	11	49	3	6	8	11
Southern Group	4	2	8	20	55	3	2	2	4

Rocky Mountain Group: Arizona, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, South Dakota, Utah, Wyoming; *Pacific Group:* Alaska, California, Guam, Hawaii, Oregon, Washington; *North Central Group:* Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, Wisconsin; *Eastern Group:* Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, West Virginia; *Southern Group:* Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia.

**Fire Causes Defined*

Lightning:	Self-explanatory.
Campfire:	A wildfire resulting from a fire started for cooking, heating, or providing light or warmth.
Smoking:	Wildfires caused by smokers from matches, lighters, tobacco or other smoking materials.
Debris Burning:	A wildfire spreading from clearing land, burning trash, range, stubble, meadow, right-of-ways, logging slash, or other prescribed burning.
Incendiary:	Wildfires willfully set by anyone to burn, or to spread to, vegetation or property not owned or controlled by him, and without consent of the owner or his agent.
Equipment Use:	Wildfires caused by any and all mechanical equipment other than railroad operations.
Railroad:	Wildfires caused by all railroad operations including burning rights-of-ways and ties.
Children:	Wildfires started by children less than 12 years old.
Miscellaneous:	Wildfires that cannot be properly classified under other general causes.

Source: *Wildfire Statistics* — U.S. Department of Agriculture

FOREST ACRES BURNED BY CAUSE — 1981

State	Lightning	Camp Fires	Smoking	Debris Burning	Incendiary	Equipment Use	Railroad	Children	Misc.	Total
AK	179	7	2	8	4	1	0	1	5	207
AZ	66	4	4	11	7	5	1	2	18	118
CA	13	7	1	7	12	9	3	0	16	68
CO	191	8	0	5	0	1	12	1	68	286
ID	72	5	3	38	20	17	8	8	62	233
MT	44	2	1	5	1	1	1	0	4	59
NV	94	11	10	58	30	24	11	0	10	248
NM	23	0	0	1	0	1	0	0	7	32
OR	106	7	6	10	2	5	8	5	15	164
UT	181	3	10	13	5	15	1	4	14	246
WY	31	7	7	2	5	8	0	8	11	79
TOTAL	1,000	61	44	158	86	87	45	29	230	1,740

Source: U.S. Department of the Interior, Bureau of Land Management

FIRE INCIDENT DATA — 1981

State	# Fires	Acres Burned	$ Damage (Thousands)
AK	207	292,783	5,673
AZ	118	3,948	170
CA	68	27,832	1,564
CO	286	3,385	98
ID	233	392,905	10,555
MT	59	10,464	110
NV	248	12,559	716
NM	32	3,532	12
OR	164	60,917	2,646
UT	246	53,369	1,140
WY	79	13,520	349
TOTAL	1,740	875,214	23,033

Source: U.S. Department of the Interior, Bureau of Land Management

Bureau of Land Management Fire Protection Program Statistics (1981)

Fire Stations:	131
Air Attack Bases:	17
Engines:	346
Bulldozers:	3
Aircraft:	
Air Tankers	18
Helicopters	53
Fire Personnel:	
Permanent	178
Personal & Temporary	2,000
Budget (FY'81):	
Operating and Management:	$33.5 million
Emergency Firefighting Fund:	24.6 million
Acres Protected:	
Bureau of Land Management Direct Protection	386,334,000 acres
By Other Agencies through Contract	15,658,000 acres
TOTAL	401,992,000 acres

Source: U.S. Department of the Interior, Bureau of Land Management

(Courtesy U.S. Forest Service)

Fire Service

Profile of the U.S. Fire Service

Comparison of Public Fire Protection

The NFPA has been collecting data on selected fire departments in the United States which it has compiled in a system known as the Fire Service Inventory. The data includes the department address; population served; area served in square miles; the number of pumpers, ladder trucks or aerial apparatus, and stations; the number of career, call, and volunteer firefighters; average hours worked per week for career fire fighters; size of budget; and whether the department provides emergency medical services and/or operates an ambulance service.

The NFPA has identified 28,776 fire departments in the United States which provide public fire protection at the local level. The following five tables show aggregation of data from the Fire Service Inventory for each of four geographic regions and for the United States as a whole. The four regions are based on the standard U.S. Bureau of the Census regions. The states in each region include:

Northeast: Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont.

Northcentral: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.

South: Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia.

West: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

In the tables that follow, the data is presented as summaries for each of four population stratum, those departments that protect 250,000 persons or more; those departments that protect between 50,000 and 249,999 persons; those departments that protect between 10,000 and 49,999 persons, and those departments that protect less than 10,000 persons. The data is summarized for those departments that have reported, with no attempt to project or estimate the data for departments that have not reported.

In the tables, columns 2, 4, and 6 show the number of pumpers, ladder trucks (or elevating platforms), and firestations per 1,000 persons protected. Columns 3, 5, and 7 show the number of square miles serviced by each pumper, ladder or aerial apparatus, and fire station. Since many departments do not have a ladder truck or aerial apparatus, only those departments actually reporting that they have a ladder truck or aerial apparatus are used in the calculations for columns 4 and 5.

Columns 8 and 9 show the percentage of the departments which supply emergency medical services and/or provide ambulance service.

Column 10 shows the number of career fire fighters per 1,000 persons protected. Only those departments with one or more career fire fighters were used in the calculations for this column.

Column 11 shows the number of paid on call or volunteer fire fighters per 1,000 persons protected. Only those departments with one or more paid, on call, or volunteer firefighters were used in the calculations for column 11.

The number in the second row below each figure is the number of fire departments that have reported the data necessary for the calculation and were used in the calculation.

COMPARISON OF PUBLIC FIRE PROTECTION BY REGION AND POPULATION PROTECTED

Population Range	No. of fire departments	Pumpers per 1,000 persons protected	Sq. mi. serviced by each pumper	Ladder trucks per 1,000 persons protected	Sq. mi. serviced by each ladder truck	Fire stations per 1,000 persons protected	Sq. mi. serviced by each fire station	% providing EMS	% providing ambulance service	Career fire fighters per 1,000 persons protected	Call or volunteer fire fighters per 1,000 persons protected
Northeast Region											
250,000 or more	6	0.04 6	1.5 6	0.02 6	2.5 6	0.04 6	1.4 6	50.0 6	16.7 6	1.83 6	
50,000–249,999	99	0.08 31	2.3 29	0.04 31	5.0 29	0.07 28	2.6 28	61.5 26	38.7 62	2.32 82	2.06 26
10,000–49,999	865	0.19 252	28.6 231	0.06 180	19.8 159	0.11 232	51.7 227	55.9 227	42.5 400	1.65 281	3.76 503
Less than 10,000	5897	0.70 833	23.6 822	0.19 145	19.8 143	0.34 830	50.4 818	42.6 847	28.9 1140	1.30 124	11.20 1525
Northcentral Region											
250,000 or more	14	0.05 14	3.6 14	0.03 14	6.9 14	0.05 14	3.6 14	92.9 14	42.9 14	1.56 14	
50,000–249,999	122	0.07 36	5.2 36	0.03 35	14.4 35	0.07 36	5.7 36	97.1 35	65.3 75	1.35 114	0.82 24
10,000–49,999	1010	0.17 247	12.0 245	0.05 199	30.3 198	0.09 249	21.9 247	77.8 248	50.9 491	1.01 616	1.79 629
Less than 10,000	8327	0.70 659	36.9 654	0.20 88	48.4 88	0.36 656	74.1 651	49.7 672	25.8 1083	1.70 310	8.55 2343

					South Region						
250,000 or more	33	0.06 33	11.2 33	0.02 33	31.4 33	0.06 33	11.8 33	69.7 33	42.4 33	1.47 33	1.50 10
50,000–249,999	155	0.09 84	17.2 82	0.02 72	44.3 71	0.07 82	21.5 80	62.5 80	20.6 102	1.46 133	1.00 45
10,000–49,999	953	0.17 332	60.5 327	0.04 121	50.9 121	0.10 332	99.0 327	59.6 322	21.8 468	1.25 505	1.71 504
Less than 10,000	7525	0.53 605	59.7 610	0.28 37	54.3 37	0.35 645	101.9 654	34.4 665	10.9 910	1.29 261	6.57 1338
					West Region						
250,000 or more	20	0.06 20	18.5 20	0.02 20	69.2 20	0.05 20	19.7 20	95.0 20	15.0 20	1.19 20	0.56 6
50,000–249,999	138	0.08 35	9.3 35	0.02 32	30.8 32	0.06 34	11.5 34	100.0 25	21.7 83	1.14 126	0.49 38
10,000–49,999	450	0.23 115	20.9 115	0.05 63	42.2 63	0.11 117	43.0 117	81.0 63	26.6 233	1.00 338	1.62 290
Less than 10,000	3162	0.86 407	44.6 406	0.37 26	56.6 27	0.48 415	78.9 413	55.6 257	22.7 617	1.31 290	7.97 850
					All Regions						
250,000 or more	73	0.05 73	10.6 73	0.02 73	27.0 73	0.05 73	11.0 73	79.5 73	32.9 73	1.49 73	1.26 16
50,000–249,999	514	0.08 186	11.2 182	0.03 170	26.5 167	0.07 180	13.5 178	75.3 166	34.8 322	1.49 455	0.98 133
10,000–49,999	3278	0.18 946	33.9 918	0.05 563	32.9 541	0.10 930	60.4 918	65.5 860	36.7 1592	1.18 1740	2.25 1926
Less than 10,000	24911	0.68 2504	37.9 2492	0.22 296	37.7 295	0.37 2546	74.2 2536	2.7 2441	22.6 3750	1.42 985	8.71 6056

Profile of Major Metropolitan Fire Departments

The following chart shows some basic data about the metropolitan fire departments in the United States. A metropolitan fire department is defined for this purpose as one which protects 200,000 persons or more or which has at least 400 career fire fighters. The chart shows the area served in square miles, the population protected, the number of career firefighters, the average hours per week worked, the number of call or volunteer firefighters, the number of pumpers, ladder trucks or aerial apparatus, and fire stations; the approximate annual budget; and whether the department provides emergency medical service and/or ambulance service. The table on "Profile of EMS Delivery in Metropolitan Areas" provides additional details of the emergency medical service delivery for the same communities.

While budget information is presented here, the reader is cautioned against using this information for comparison purposes. Differing budgeting and accounting procedures mean that such expenses as capital improvements, pensions, disability costs, and possibly other costs may or may not be included and this can have an impact on budgets. Likewise, the hours worked per week and whether the fire department provides ambulance service will have serious impact on the size of the budget.

FIRE PROTECTION PROFILE OF MAJOR METROPOLITAN CITIES

Fire Department	State	Area Protected (sq. miles)	Population Protected	Career Firefighters	Work Week	Call or Volunteer Fire-fighters	Pumpers	Ladder Trucks	Stations	Budget	Provide Emergency Medical Service	Operate Ambulance Service
Akron	OH	61	237,000	386	52	0	14	5	14	14,000,000	Y	Y
Albuquerque	NM	100	335,000	460	56	0	17	5	17	13,800,000	Y	N
Anaheim	CA	43	210,000	217	56	0	11	3	9	11,200,000	Y	N
Anchorage	AK	500	230,000	276	56	60	21	3	15	22,100,000	Y	Y
Anne Arundel County	MD	440	370,000	391	54	1500	29	5	29	16,100,000	Y	Y
Atlanta	GA	136	425,000	920	56	0	33	18	33	22,000,000	Y	N
Austin	TX	128	400,000	521	56	0	25	9	26	18,000,000	Y	N

Baltimore County	MD	621	672,000	900	53	3000	89	9	52	25,000,000	Y	Y
Baltimore	MD	91	786,775	1850	47	0	52	29	57	63,200,000	Y	Y
Baton Rouge	LA	73	240,000	510	56	0	18	7	0	11,000,000	N	N
Birmingham	AL	100	275,000	600	52	0	29	5	29	18,200,000	Y	N
Boston	MA	46	640,000	1580	42	0	33	21	34	47,600,000	Y	N
Buffalo	NY	42	370,000	975	40	0	23	13	31	19,694,355	Y	N
Charlotte	NC	138	322,734	570	52	0	25	8	24	13,700,000	Y	N
Chattanooga	TN	127	165,565	441	48	0	22	8	22	9,000,000	Y	Y
Chicago	IL	228	3,005,000	5021	42	0	104	60	102	140,000,000	Y	Y
Cincinnati	OH	76	383,058	808	48	0	28	14	27	23,614,700	Y	N
Cleveland	OH	77	574,269	995	48	0	33	18	31	38,000,000	Y	N
Cobb County	GA	326	325,000	282	56	0	19	4	19	7,900,000	N	N
Colorado Springs	CO	134	230,000	277	56	0	13	4	12	8,500,000	Y	N
Columbus	OH	183	564,871	811	56	0	28	10	27	29,500,000	Y	Y
Contra Costa Cty Cons	CA	185	283,000	268	56	60	21	4	18	10,500,000	Y	N
Corpus Christi	TX	116	235,000	295	56	0	15	4	12	6,500,000	Y	Y
Dallas	TX	378	904,000	1499	54	1499	48	22	48	54,250,000	Y	Y
DeKalb County	GA	258	480,000	502	56	0	23	4	20	11,690,440	Y	Y
Denver	CO	115	491,000	896	48	0	27	16	26	36,000,000	Y	N
Detroit	MI	139	1,300,000	1317	50	0	45	28	52	89,134,837	Y	Y
District of Columbia	DC	69	631,000	1187	48	0	32	17	33	44,594,100	Y	Y
El Paso	TX	240	425,124	505	56	0	30	7	25	14,131,625	N	N
Fairfax County Fire and Rescue	VA	399	628,000	907	56	443	29	12	29	27,000,000	Y	Y
Forth Worth	TX	256	400,000	656	56	0	29	11	30	20,000,000	Y	N
Fresno City	CA	65	235,000	289	56	0	13	5	13	14,200,000	Y	N
Hartford	CT	18	137,000	427	42	0	12	6	12	12,000,000	N	N

Fire Department	State	Area Protected (sq. miles)	Population Protected	Career Firefighters	Work Week	Call or Volunteer Fire-fighters	Pumpers	Ladder Trucks	Stations	Budget	Provide Emergency Medical Service	Operate Ambulance Service
Honolulu	HI	620	822,000	975	56	0	38	12	40	27,600,000	Y	N
Houston	TX	556	2,200,000	2900	46	0	72	34	74	120,300,000	Y	Y
Indianapolis	IN	81	505,000	769	56	0	31	17	31	22,000,000	Y	N
Jacksonville	FL	844	600,000	750	56	304	43	8	43	24,000,000	Y	Y
Jersey City	NJ	19	243,000	712	42	0	18	11	17	20,000,000	N	N
Kansas City	MO	316	446,562	790	48	0	31	15	31	23,698,000	Y	N
Kern County	CA	8000	290,000	475	56	230	65	1	42	15,174,712	Y	N
Knoxville	TN	76	182,000	401	56	0	20	8	19	11,900,000	Y	N
Long Beach	CA	55	365,000	477	56	0	18	8	21	35,000,000	Y	Y
Los Angeles City	CA	464	2,900,838	2783	56	0	100	47	104	132,000,000	Y	Y
Los Angeles County	CA	2190	2,269,087	2385	56	0	138	18	128	132,000,000	Y	N
Louisville Division of Fire	KY	70	300,000	610	56	0	22	10	23	14,803,437	N	N
Memphis	TN	320	750,000	1210	56	0	49	23	49	41,000,000	Y	Y
Metro Dade County	FL	1924	980,000	1191	48	6	27	13	36	48,389,000	Y	N
Metro Nashville	TN	533	485,000	736	56	0	34	14	33	20,000,000	N	N
Miami	FL	34	400,000	651	50	0	19	9	12	41,000,000	Y	N
Milwaukee	WI	96	636,000	1107	52	0	36	19	36	48,000,000	Y	N
Minneapolis	MN	59	375,000	510	56	0	19	11	20	22,000,000	Y	N
Mobile	AL	142	205,200	388	56	0	18	4	18	9,588,000	Y	N
Montgomery County Fire and Rescue	MD	506	600,000	715		750	31	15	33	38,000,000	Y	Y
New Haven	CT	18	125,000	416	42	0	10	6	10	12,000,000	Y	N
New Orleans	LA	399	600,000	915	56	0	40	13	36	24,000,000	N	N

New York City	NY	303	7,100,000	12000	40	0	210	138	221	419,200,000	N	N
Newark	NJ	23	329,000	879	42	0	22	11	26	19,000,000	N	N
Norfolk	VA	63	280,000	444	56	0	15	8	14	12,297,787	N	N
Oakland	CA	56	329,000	468	52	0	23	7	23	32,263,489	Y	N
Oklahoma City	OK	335	390,000	763	56	0	27	11	30	18,000,000	N	N
Omaha	NE	92	333,083	555	56	0	22	9	18	13,435,426	Y	Y
Orange County	CA	70	600,000	450	67	535	61	7	44	36,000,000	Y	N
Orange County	FL	870	250,000	450	56	50	40	4	25	15,000,000	Y	N
Philadelphia	PA	129	1,688,210	2858	42	0	66	33	68	71,348,188	Y	Y
Phoenix	AZ	345	825,000	839	56	0	36	8	35	35,000,000	Y	N
Pittsburgh	PA	55	450,000	1111	42	0	39	20	39	23,328,680	N	N
Portland Fire Bureau	OR	110	380,000	665	56	0	28	10	27	27,000,000	Y	N
Prince George's County	MD	494	686,000	513	42	1100	45	21	46	17,300,000	Y	Y
Providence	RI	19	156,804	479	42	0	15	8	14	8,100,000	Y	N
Richmond	VA	63	220,500	573	56	0	21	9	20	16,000,000	N	N
Rochester City	NY	36	241,000	605	42	0	17	9	16	26,400,000	Y	N
Sacramento	CA	95	281,104	432	56	100	19	9	19	21,000,000	Y	N
Saint Louis	MO	62	500,000	811	52	0	30	16	30	17,872,520	N	N
Saint Paul Fire and Safety Services	MN	55	270,000	408	56	0	18	7	16	14,300,000	Y	Y
Saint Petersburg	FL	58	250,000	295	56	0	11	4	10	10,277,000	Y	N
Salt Lake City	UT	65	200,000	361	56	0	14	5	14	7,649,682	Y	N
Salt Lake County	UT	526	250,000	240	56	40	15	2	14	9,342,318	Y	Y
San Antonio	TX	267	783,296	1102	56	0	40	15	38	30,000,000	Y	Y
San Diego	CA	325	893,000	776	56	0	40	11	39	31,000,000	Y	N
San Francisco	CA	49	675,000	1569	49	0	41	18	41	92,378,000	N	N
San Jose	CA	222	680,000	651	56	0	28	10	28	23,150,000	Y	N

Fire Department	State	Area Protected (sq. miles)	Population Protected	Career Firefighters	Work Week	Call or Volunteer Fire-fighters	Pumpers	Ladder Trucks	Stations	Budget	Provide Emergency Medical Service	Operate Ambulance Service
Santa Ana	CA	27	202,000	211	56	0	10	3	10	11,200,000	Y	N
Seattle	WA	98	475,000	950	45	0	32	11	33	36,000,000	Y	N
Shreveport	LA	99	220,000	392	56	0	18	7	18	11,000,000	Y	N
Springfield	MA	34	157,000	472	42	0	13	7	11	9,000,000	N	N
Syracuse	NY	26	172,000	489	48	0	11	6	12	11,500,000	Y	N
Tallahassee	FL	700	250,000	139	54	0	7	2	5	3,500,000	N	N
Tampa	FL	84	278,000	531	52	0	20	5	18	17,100,000	Y	Y
Toledo	OH	86	354,635	525	48	0	20	6	20	13,952,630	Y	Y
Tucson	AZ	102	342,000	402	56	0	16	6	15	14,600,000	Y	N
Tulsa	OK	181	366,000	689	54	0	31	13	31	16,000,000	N	N
Ventura County	CA	865	320,000	321	56	175	27	1	27	21,000,000	Y	N
Virginia Beach	VA	320	262,000	261	56	250	15	4	15	7,500,000	N	N
Wichita	KS	110	280,000	397	56	0	19	12	17	10,000,000	Y	N
Worcester	MA	38	156,804	457	42	0	16	7	13	9,000,000	N	N
Yonkers	NY	21	210,000	418	37	0	10	6	12	8,400,000	Y	N

Profile of Emergency Medical Service Delivery in Metropolitan Areas

The following chart shows how emergency medical services are provided in the areas protected by 96 metropolitan fire departments. A metropolitan fire department is defined for this purpose as one which protects 200,000 or more persons or has at least 400 career fire fighters. The chart shows who provides first responder or basic life support service (column 1); who transports the patient in basic life support situations (column 2); who provides advanced life support or paramedic service (column 3); and who transports the patient in advanced life support situations (column 4). In those areas where a private company provides emergency medical service or transportation, column 5 shows whether a contract exists between the community and the private company. Column 6 shows who bills the patient for transportation, and column 7 shows the amount of the basic service.

The codes used in this chart are:

F: Fire Department
P: Police Department
S: Separate Public Agency
C: Private Ambulance Company

EMERGENCY MEDICAL SERVICE DELIVERY FOR MAJOR METROPOLITAN COMMUNITIES

Dept.	State	First Responder	BLS Trans	ALS (Paramed)	ALS Transport	Contract Bet. Community and Private Ambulance Company	Who Bills	Fee in Dollars
Akron	OH	C	C	F	F	—	—	Free
Albuquerque	NM	F	C	F	C	Y	C	50
Anaheim	CA	F	C	F	C	Y	C	
Anchorage	AK	F	F	F	F	—	—	
Anne Arundel County	MD	F	F	F	F	—	—	Free
Atlanta	GA	F	C	F	C	Y	county	
Austin	TX	S	S	S	S	Y	city	
Kern County	CA	F, C	C	C	C	N	C	
Baltimore City	MD	F	F	F	F	N	—	Free
Baltimore County	MD	F	F	F	F	N	—	Free
Baton Rouge	LA	C	C	C	C	N	—	
Birmingham	AL	F	C	F	C	Y	C	80
Boston	MA	S	S	S	S	S	city	
Buffalo	NY	F	C	C	C	Y	C	65
Charlotte	NC	F, S	S	S	S	N	county	75
Chattanooga	TN	F	F	F	F	N	—	Free
Chicago	IL	F	F	F	F	N	—	Free
Cincinnati	OH	F	F	F	F	N	—	Free
Cleveland	OH	F	C	F	C	Y	C	
Cobb County	GA	C	C	C	C	Y	C	25+
Colorado Springs	CO	F	C	F	C	N	C	

Dept.	State	First Responder	BLS Trans	ALS (Paramed)	ALS Transport	Contract Bet. Community and Private Ambulance Company	Who Bills	Fee How Much
Columbus	OH	F	F	F	F	N	—	Free
Contra Costa Cty	CA	F	C	F	C	Y	C	
Corpus Christi	TX	F	F	F	F	N	city	60
Dallas	TX	F	F	F	F	N	city	75
DeKalb County	GA	F	F	F	F	N	S	35
Denver	CO	F, S	S	S	S	N	S	
Detroit	MI	F	F	F	F	N	F	90
El Paso	TX	F	S	S	S			
Fairfax County	VA	F	F	F	F	—	—	Free
Fort Worth	TX	F	C	C	C	Y	C	
Fresno City	CA	F	C	F	C	Y	C	
Hartford	CT	F, P, C	C		C	Y	city	
Honolulu	HI	F, S	S	S	S	N	city	
Houston	TX	F	F	F	F	N	city	45
Indianapolis	IN	F	F, S	F	F, S	—	city	
Jacksonville	FL	F	F	F	F	N	S	45-50
Jersey City	NJ	P	S	S	S	S	city	
Kansas City	MO	F	C	F	C	Y	C	150 +
Knoxville	TN	F	C	F	C	Y	city	
Long Beach	CA	F	F	F	F	N	city	
Los Angeles City	CA	F	F	F	F	N		70
Los Angeles County	CA	F	C	F	C	Y	C	
Louisville	KY	S	S	S	S	N	S	
Memphis	TN	F	F	F	F	N	city	125
Metro Dade	FL	F	C	F	F	Y	C/S	75
Miami	FL	F	C	F	F	Y	C	75 +
Milwaukee	WI	F	C	F	F	Y	C	100
Minneapolis	MN	F	S	S	S	N	county	
Mobile	AL	F	C	F	C	Y	city	
Montgomery County	MD	F	F	F	F	N	—	Free
Metro Nashville	TN	F	F	F	F	N	city	50 +
Newark	NJ	S	S	S	S	N	S	
New Haven	CT	F, C	C		C	Y	S	
New Orleans	LA	P	P	P	P	N		

New York City	NY	S	S	S	S	N	Free	
Norfolk	VA	F	S	S	S	N		
Oakland	CA	F	C	C	C	Y		
Oklahoma City	OK	F	S	F	S	N	S	
Omaha	NE	F	F	F	F	N	—	Free
Orange County	CA	F	S	F	S	N	—	
Orange County	FL	F	C	F	C	Y	C	
Philadelphia	PA	F	F	F	F	N	—	
Phoenix	AZ	F	C	F	C	Y	C	
Pittsburg	PA	S	S	S	S	N	S	100
Portland	OR	F	C	F	C	N	C	145-175
Prince George's County	MD	F	F	F	F	N	—	Free
Providence	RI	F	C	F	C	N	—	
Richmond	VA	F, C	F, C	F	F	Y	C	
Rochester	NY	F, C	C	C	C	Y	C	100
Sacramento	CA	F	C		C	N	C	75-100
Saint Louis	MO	S	S	S	S	N	S	85 +
Saint Paul	MN	F	F	F	F	N	S	50
Saint Petersburg	FL	F	C	F	C	Y	C	100
Salt Lake City	UT	F, C	C	F	C	Y	C	100-120
Salt Lake County	UT	F	F	F	F	N		
San Antonio	TX	S	S	S	S	N		
San Diego	CA	F	C	C	C	Y	C	
San Francisco	CA	F	C	F	C	Y	S	
San Jose	CA	F	C	C	C	Y	C	
Santa Ana	CA	F	F	F	F	N	—	
Seattle	WA	F	F	F	F	N		
Shreveport	LA	F	C	none	C	Y	C	
Springfield	MA	C	C	C	C	Y	C	
Syracuse	NY	F	C	F, C	C	N	C	
Tallahassee	FL	C	C	C	C	N	—	
Tampa	FL	S	S	F	F	N	county	50-100
Toledo	OH	F	C	F	F, C	N	C	50-60
Tucson	AZ	F	F	F	F	N		
Tulsa	OK	S	S	S	S		S	
Ventura County	CA	F	C	C	C	Y	C	
Virginia Beach	VA	S	S	S	S	—	city	
Washington	DC	F	F	F	F	N	city	35-70
Wichita	KS	F	S	S	S	N	city	55 +
Worchester	MA	F, P	S	S	S	Y	city	
Yonkers	NY	P	C	none	C	Y	C	

The Cost of Maintaining a Fire Department/1982

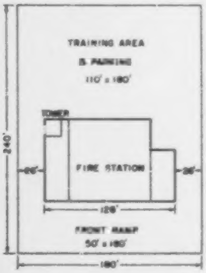
Fire Station Construction Costs

The table below can be used to calculate the approximate cost of building a station in selected regions of the U.S. After choosing the location most comparable to yours, multiply the size × cost per sq. ft. × multiplier to calculate the average cost.

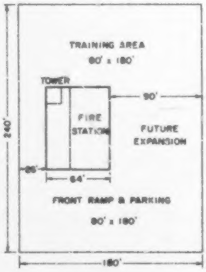
FIRE STATION CONSTRUCTION COSTS
(Size × cost per sq. ft. × multiplier = average cost per city)

Station Size	Per. Sq. Ft.	Local Building Cost Multiplier	Locations
10,000 sq. ft.	$22.80	2.5	Boston, MA
10,000 sq. ft.	$22.80	2.75	New York City, NY
10,000 sq. ft.	$22.80	2.124	Norfolk, VA
10,000 sq. ft.	$22.80	2.40	Miami, FL
10,000 sq. ft.	$22.80	2.62	Houston, TX
10,000 sq. ft.	$22.80	2.946	Cleveland, OH
10,000 sq. ft.	$22.80	2.75	Chicago, IL
10,000 sq. ft.	$22.80	2.58	Denver, CO
10,000 sq. ft.	$22.80	2.66	Phoenix, AZ
10,000 sq. ft.	$22.80	2.92	San Diego, CA
10,000 sq. ft.	$22.80	2.97	Los Angeles, CA
10,000 sq. ft.	$22.80	2.56	Seattle, WA

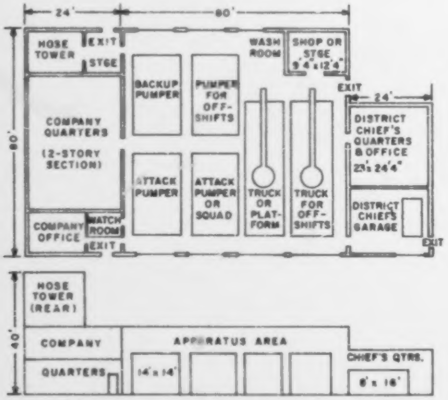
Source: *Dodge Reports*, March 1982


TRAINING AREA
& PARKING
110' x 180'
TOWER
FIRE STATION
26'
26'
128'
FRONT RAMP
50' x 180'
240'
180'

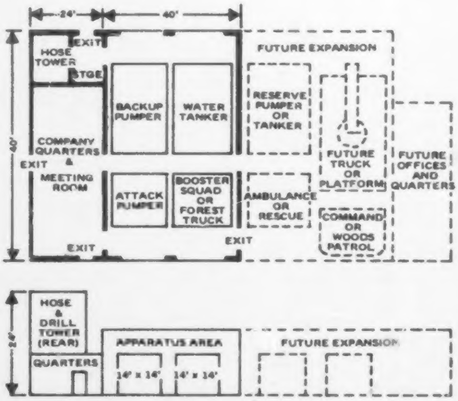
Plot plan for a typical district fire station for urban and suburban services. Minimum recommended plot size is 43,200 sq.ft.


TRAINING AREA
80' x 180'
TOWER
FIRE STATION
90'
FUTURE EXPANSION
26'
64'
FRONT RAMP & PARKING
80' x 180'
240'
180'

Plot plan for a typical rural fire station. Minimum recommended plot size is 43,200 sq. ft.


24'
80'
HOSE TOWER
EXIT
STGE
WASH ROOM
SHOP OR STGE 9'4"x12'4"
EXIT
24'
BACKUP PUMPER
PUMPER FOR OFF-SHIFTS
COMPANY QUARTERS (2-STORY SECTION)
DISTRICT CHIEF'S QUARTERS & OFFICE 23'x24'4"
ATTACK PUMPER
ATTACK PUMPER OR SQUAD
TRUCK OR PLAT-FORM
TRUCK FOR OFF-SHIFTS
DISTRICT CHIEFS GARAGE
COMPANY OFFICE
WATCH ROOM
EXIT
EXIT
80'
HOSE TOWER (REAR)
40'
COMPANY
QUARTERS
APPARATUS AREA
14' x 14'
CHIEF'S QTRS.
8' x 16'

Elevation and plan view of a typical urban fire station.


24'
40'
EXIT
HOSE TOWER
STGE
FUTURE EXPANSION
BACKUP PUMPER
WATER TANKER
RESERVE PUMPER OR TANKER
COMPANY QUARTERS & MEETING ROOM
EXIT
FUTURE TRUCK OR PLATFORM
FUTURE OFFICES AND QUARTERS
ATTACK PUMPER
BOOSTER SQUAD OR FOREST TRUCK
AMBULANCE OR RESCUE
COMMAND OR WOODS PATROL
EXIT
EXIT
40'
HOSE & DRILL TOWER (REAR)
24'
QUARTERS
APPARATUS AREA
14' x 14'
14' x 14'
FUTURE EXPANSION

Elevation and plan view of a typical rural fire station.

Fire Department Apparatus and Equipment

The selection and purchase of apparatus is both difficult and critical for fire departments. Much planning and evaluation is necessary to determine which types of equipment will best serve the department within the parameters of its budget. Consulting NFPA 1901, *Standard for Automotive Fire Apparatus*, is a good place to begin since the information in this standard applies to new, used, and "build-it-yourself" type fire apparatus.

In the United States, there are more than 100 manufacturers of fire apparatus. A list of those builders who are members of the Fire Apparatus Manufacturers Division of the Truck Body and Equipment Association is included here. The companies listed provide basic specifications, blueprints, and recommendations on the various types, designs, costs, and variety of equipment available on new apparatus. In addition, they can often provide source information about available "used" apparatus.

Fire Apparatus Manufacturers

(A) Apparatus Builder
(C) Chassis Builder
(S) Supplier

Akron Brass Company (S)
P.O. Box 86
Wooster, OH 44691
(216) 264-5678

Alexis Fire Equipment Company (A)
1209 E. Broadway
P.O. Box 425
Alexis, IL 61412
(309) 482-6121

Aluminum Ladder Company (S)
P.O. Box 5329
Florence, SC 29502
(803) 662-2595

American LaFrance (A)
100 E. LaFrance St.
Elmira, NY 14904
(607) 734-8181

American Modular Body Corporation (S)
18 Industrial Dr.
Smithfield, RI 02917
(401) 231-0380

Atlas Steel Products Company, Inc. (A)
1818 New Hope Church Rd.
P.O. Box 17246
Raleigh, NC 27619
(919) 876-2321

The Boardman Company (A)
1401 SW 11th St.
P.O. Box 26088
Oklahoma City, OK 73126
(405) 634-5434

Boston Industrial Products, Inc. (S)
P.O. Box 168
Hohenwald, TN 38462
(615) 796-3272

Brumbaugh Body Company, Inc. (A)
100 W. Plank Rd.
Altoona, PA 16602
(814) 944-6103

Crown Coach Corporation (A)
Fire Coach Division
2500 E. 12th St.
Los Angeles, CA 90021
(213) 627-4021

W. S. Darley & Company (A)
2000 Anson Dr.
Melrose Park, IL 60160
(312) 345-8050

Duo-Safety Ladder Corporation (S)
513 W. 9th Ave.
P.O. Box 497
Oshkosh, WI 54902
(414) 231-2740

Duplex Truck Division/The Nolan Company (C)
P.O. Box 295
Midvale, OH 44653
(614) 922-5955

LA COPES WITH A TIGHT BUDGET BY UPDATING OLD APPARATUS

In an attempt to combat the high cost of new fire apparatus, the Los Angeles City Fire Department has developed the service life extension program (SLEP). This program requires periodic part replacement together with the upgrading and revitalizing of fire equipment to extend apparatus life 75 to 100 percent.

Increased apparatus use is due to more arson fires and more EMS and fire-related incidents in the Los Angeles area that have caused equipment to wear down faster than usual. The high cost of apparatus parts (and sometimes the difficulty in finding them), lack of skilled maintenance, and personnel reductions have further complicated the problem of maintaining old apparatus.

Before even planning the service life extension program, Los Angeles had to consider possible disadvantages to the program such as the obsolete design of some currently used triple-combination apparatus and the problems that could develop. Unavailability of some parts; unsafe seating; metal fatigue, rust, and corrosion; and inadequate compartment space, tire size, braking system, and water tank capacity were among the concerns of the department.

An initial step in planning such a SLEP involves establishing a separate renovation operation within the maintenance section. This means allocating funds, hiring more personnel to perform apparatus renovations, and providing additional work space. However, before any of this occurs a commitment by management to explore all advantages of the program is necessary. A number of options regarding the adoption of the program must be considered: whether or not to do the work in-house or to contract outside assistance; whether to make the investment in hiring additional personnel, plant tools, and equipment or to contract the work out to private sector fire apparatus builders and truck repair companies.

Once it has been decided which pieces of apparatus will be undergoing renovation, a good inspection plan should be developed. Skilled personnel should be assigned to inspect apparatus, to design specifications and spending programs, to chart progress, and to oversee the project to completion.

The purpose of the service life extension program is saving cost. A revitalized triple-combination pumper costs approximately $60,000 — $75,000 as does a renovated tractor-drawn aerial ladder truck. The same apparatus bought new would cost approximately $115,000 and $220,000 — $250,000 respectively. As part of their fleet, the Los Angeles City Fire Department has 173 pumps (1500-gpm triples) and 60 aerial trucks.

One money-saving feature of a SLEP is the lower operating costs that result from the reduced maintenance and fuel costs of using more efficient components such as diesel engines, disc brakes, and higher capacity pumps. The cost of new materials and labor is also lower with the reuse of apparatus parts that do not wear out such as frames, axles, housings, and body parts.

Cost Comparison Between New and Rebuilt Equipment

	New	Rebuilt
Initial cost	$220,000	$56,950
Straight-line depreciation over 20 years	$10,500	0 (fully depreciated)
SLEP cost	0	$80,000
Straight-line SLEP depreciation	0	4,000
Average annual maintenance cost over 20 years	2,673	2,673
Annual cost	$13,173	$6,673

Elkhart Brass Manufacturing Company, Inc. (S)
1302 W. Beardsley Ave.
P.O. Box 1127
Elkhart, IN 46515
(219) 295-8330

Emergency One, Inc. (A)
1701 SW 37th Ave.
Ocala, FL 32671
(904) 237-1122

FMC Corporation (A)
Fire Apparatus Operation
516 Dearborn St.
Tipton, IN 46072
(317) 675-2185

Feecon Corporation (S)
One Walkup Dr.
P.O. Box 338
Westboro, MA 01581
(617) 366-9137

Fire Apparatus Division of Collins Industries, Inc. (A)
P.O. Box 58
Hutchinson, KS 67501
(316) 633-4441

Fire Appliance Company of Texas (A)
1708 E. Scott
Wichita Falls, TX 76303
(817) 766-0642

Fire Research Corporation (S)
26 Southern Blvd.
Nesconset, NY 11767
(516) 724-8888

Fire Trucks, Inc. (A)
80 N. Rose St.
Mt. Clemens, MI 48043
(313) 568-7532

Ford Motor Company (C)
Ford Division/Heavy Truck Sales
300 Ren-Cen
P.O. Box 43308
Detroit, MI 48243
(313) 568-7532

General Safety Equipment Corp. (A)
550 Eighth Ave.
P.O. Box 249
North Branch, MN 55056
(612) 674-4804

Gibson Motor & Machine Service, Inc. (A)
16 Broadway Ave.
Lawrence, MA 01841
(617) 682-4715

Grumman Emergency Products, Inc. (A)
1723 Seibel Dr., N.E.
Roanoke, VA 24012
(703) 982-6666

Hale Fire Pump Company (S)
700 Spring Mill Ave.
Conshohocken, PA 19428
(215) 825-6300

Clifford B. Hannay & Son, Inc. (S)
600 E. Main St.
Westerlo, NY 12193
(518) 597-3791

Hendrickson Mobile Equipment (C&S)
8001 W. 47th St.
Lyons, IL 60534
(312) 447-4600

Imperial Fire Hose Company (S)
8668 NW S. River Dr.
Miami, FL 33166
(305) 883-7997

Jaco Industries, Inc. (A)
661 Pillans St.
Mobile, AL 36603
(205) 432-5000

Ladder Towers, Inc. (A)
RD2, Cocalico Creek Rd.
Ephrata, PA 17522
(717) 859-1176

Mack Trucks, Inc. (C&A)
Fire Apparatus Division (5N1)
Box M
Allentown, PA 18105
(215) 439-3011

National Foam System, Inc.
150 Gordon Dr.
Lionville, PA 19353
(215) 363-1400

Oshkosh Truck Corporation (C&A)
P.O. Box 2566
Oshkosh, WI 54903
(414) 235-9150

Pemberton Fabricators, Inc. (C)
Chassis Division
30 Indel Ave.
Rancocas, NJ 08073
(609) 267-0922

Pierce Manufacturing Inc. (A)
315 S. Pierce Ave.
Appleton, WI 54911
(414) 731-5251

Peter Prisch & Sons Company
1308 35th St.
Kenosha, WI 53140
(414) 658-8141

Saulsbury Fire Equipment Company (A)
Community Drive, P.O. Box 430
Tully, NY 13159
(315) 696-8909

Seagrave Fire Apparatus, Inc. (C&A)
105 E. 12th St.
Clintonville, WI 54929
(715) 823-3194

Smeal Fire Equipment Company (A)
Snyder, NE 68664
(402) 568-2221

Snorkel Division of A-T-O Inc. (A)
P.O. Box 65, Stockyards Station
St. Joseph, MO 64504
(913) 989-4481

Span Instruments, Inc. (A)
1947 Ave. "K"
P.O. Box 709
Plano, TX 75074
(214) 423-5320

Spartan Motors Inc. (C)
1000 Reynolds Rd.
P.O. Box 440
Charlotte, MI 48813
(517) 543-6400

Sutphen Corporation (A)
7000 Columbus-Marysville Rd.
Amlin, OH 43002
(614) 889-1005

Towers Fire Apparatus Company, Inc. (A)
502 S. Richland St.
Freeburg, IL 62243
(618) 539-3863

Truck Cab Manufacturing, Inc. (S)
2420 Anderson Ferry Rd.
Cincinnati, OH 45238
(513) 922-1300

Universal Fire Apparatus Corporation (A)
613 Center St.
Logansport, IN 46947
(219) 753-3223

Waterous Company (S)
300 John E. Carroll Ave., E
South St. Paul, MN 55075
(612) 293-5000

Westates Truck Equipment Corporation (A)
3641 Haven Ave.
P.O. Box 2183
Menlo Park, CA 94025
(415) 364-4500

Western States Fire Apparatus, Inc. (A)
1389 Baseline
Box 646
Cornelius, OR 97113
(503) 357-2163

Price Range for Fire Department Apparatus (1982)

NFPA surveyed several fire apparatus manufacturers to determine the current price range for a variety of apparatus. The following figures represent the results of that survey. Price ranges are exclusive of allowances for any required ancillary equipment, except that which is provided as standard.

Approximate Costs

Custom Pumper: $100,000 — $150,000. Apparatus completely built by one company, including chassis, frame, truck body, etc.

Commercial Pumper: $60,000 — $125,000. Apparatus where chassis is built by one company and compartments, hose, body, etc, by another.

100′ Aerial Elevated Platform: $260,000 — $380,000. Quintuple pump, water tank, hose body.

100′ Tractor-trailer Aerial: $220,000 — $325,000.

100′ Aerial - Pre-pipe: $270,000 — $325,000. Full quintuple pump, water tank, hose body.

100′ Straight Axle Aerial: $210,000 — $280,000. Quintuple pump, water tank.

100′ Straight Axle Aerial: $185,000 — $210,000.

100′ Rear Mount Aerial: $180,000 — $290,000.

100′ Midship Aerial: $175,000 — $250,000.

85′ Aerial Elevated Platform: $300,000 — $360,000. Full Quintuple.
85′ Straight Axle Aerial: $185,000 — $200,000.
75′ Aerial Elevated Platform: $225,000 — $250,000. Full Quintuple.
75′ Straight Axle Aerial: $175,000 — $195,000.
55′ Elevated Water Stream: $170,000 — $180,000, Custom Chassis. $140,000 — $150,000 Commercial Chassis.

PRICE RANGES FOR FIRE EQUIPMENT

The following price ranges are as of mid-1982. Due to the constant fluctuation in prices however, all prices listed here are subject to change. In addition, these prices represent single unit pricing; no adjustments have been made for competitive bidding or quantity discounts.

Item	Price
PROTECTIVE CLOTHING	
Coats (NFPA 7.5 Nomex)	$168-195.00 plus accessories
Pants	116-164.00
Boots (Insulated)	
Day	75-79.00
Nite	60-64.00
Helmets	
660 metro c	70.00
660-72 Phoenix	59-68.00
Gloves	
Leather w/Nomex or Kevlar Wristlet	17-39.50
Hoods (Nomex aramid fiber)	21-26.50
Proximity Suit	407.00
Fire Chemical Suit	700-1630.00
Entry Suit	1350.00
Self-Contained Breathing Apparatus	
Positive Pressure 30 minute Service life	850-1300.00 (MSA & Survivair)
Positive Pressure 60 minute Service life	1400.00
Closed Circuit 60 minute Service life	1300-1500.00
Personal Distress Device	75-125.00
TOOLS	
Axe 6 lb. pickhead wood	$24-27.00
Axe 6 lb. pickhead fiberg	53-95.00
Axe 6 lb. flathead wood	21-28.00
Axe 6 lb. flathead fiberg	50.00
Battering Ram 50 lb.	140-150.00
Bolt Cutters (Heavy Duty)	52-147.00
Crash Axe	45-47.00
Crowbar	11-39.00
Hooligan (Halligan) Bar	85-95.00
Huxbar	96.00
N.Y. State Lock Breaker	190.00
Pichbar (4 ft)	13.00
Quic-Bar®	110.00
Sledge Hammer	25-45.00
Utility Bar	45.00
Wire Cutters (20,000v)	80-130.00
K Tool Lock Puller	86.00
Meter Wrench	27.00
Bailing Hook	3-7.00
Car Opening Tool	15.00
V-Blade Rescue Knife	30-33.00

Item	Price
Squeegees	16-46.00
Chimney Scraper	51-82.00
Salvage Covers (various sizes)	75-186.00
Water Vacuum	641.00
Water Drag & Rescue Outfit	430.00
Grapnel Hook	100-135.00
Ice Drill	46.00
Ice Chisel Bar	20.00
Pike Poles (6-20 ft)	
wood	27-78.00
fiberg	42-112.00
wood core fiberg	78-185.00
alum	41-110.00
Rescue Saw (Gasoline)	740-1050.00
Rescue Cutting Torch	675-692.00
Air Hammer Rescue Kit	283.00
Air Bag System (117T)	3325.00
Hydraulic IOT Rescue Kit	1025.00
Portable Generators	1150-2070.00
Portable Quartz Flood light	139-155.00
Portable Cable Reels	49-90.00
Portable Floodlight (Circle D)	105-153.00
Smoke Ejector (gas or elec.)	345-985.00
Lantern (battery)	19-60.00
Lantern (rechargable)	39-172.00
Lantern (wet cell battery rechargable)	85-125.00
Flashlight (rechargable)	57.50-130.00
Wheel Chock	23.00
Hose Clamp	99-275.00
Hose Jacket	235-278.00
Hose Hoist	110-115.00
Rope Winder	90.00
Hose Dryer (Elec.)	4400.00
Hose Dryer (Gas)	6900.00
Hose Washer	4260.00
Hydrant Wrench	19-27.00
Hydrant Wrench (Rachet)	113-130.00
Life Belts	90-117.00
HOSE	
Sierra Poly (DJ)	
1 ½ in.	$80.00
1 ¾ in.	90.00
2 ½ in.	125.50
3 in.	177.00
3 ½ in.	366.50
Argus Fire Chief (SJ)	
1 ½ in.	158.00
1 ¾ in.	182.00
2 in.	198.00
2 ½ in.	222.50
3 in.	261.00
Darley Stripe 100% Poly (DJ)	
1 ½ in.	57.50
1 ¾ in.	67.00
2 ½ in.	92.00
3 in.	132-170.00
3 ½ in.	325.00

Item	Price
Darley Cord (DJ)	
1 ½ in.	76.00
1 ¾ in.	91.00
2 ½ in.	118.00
3 in.	172.00
Snap-Tite Duralight	
4 in.	599.00
5 in.	810.00
Angus	
4 in.	702.00
5 in.	935.00
Hard Suction	
4 ½ in. - 10 ft	243.00
6 in. - 10 ft	406.00
Flexible Hard Suction	
4 ½ in. - 10 ft	288.00
6 in. - 10 ft	429.00
Basket Strainer	
4 ½ in.	68-85.00
6 in.	82-110.00
Brass Strainer	
4 ½ in.	138.00
6 in.	179.00
Float Dock Strainer	
4 ½ in.	407.00
6 in.	434.00
LADDERS (Aluminum)	
"A" Ladder	$245-336.00
Attic Ladder 10-14 ft	212-273.00
Folding Ladder	111-170.00
Straight Wall Ladder	
16 ft	275-285.00
20 ft	343-349.00
24 ft	403-428.00
Roof Ladder	
12 ft	264.00
14 ft	244-285.00
20 ft	316-380.00
Extension Ladder	
2 Section, 24 ft	550-558.00
2 Section, 35 ft	739-835.00
3 Section, 35 ft	910-1035.00
3 Section, 40 ft w/poles	1350.00
3 Section, 50 ft	1560.00
NOZZLES (Playpipe-Shutoff)	
Combination	
1 ½ in.	337-417.00
2 ½ in.	363-738.00
Solid Stream	
1 ½ in.	93-127.00
2 in.	351-450.00
Deck Gun	
Stang (Complete)	1650.00
2 & 3 Inlet Monitors	1425-2550.00

Item	Price
Portable Pumps	
18-20 Hp	1850-2900.00
11-18-20 Hp	4295.00
11-Hp	1400-1750.00
FOAMS/CHEMICALS	
AFFF (per gal)	$12-24.00
Hi-Expansion (per gal)	10.50
6% Protein (per gal)	8-9.00
3% Protein (per gal)	3.50-9.50
6% Flouroprotein (per gal)	10-10.50
3% Flouroprotein (per gal)	11.50-13.00
Alcohol Low Expansion (per gal)	14.00
"Slippery Water" 5 gal	58.00
Wetting Agent per gal	11.50
FITTINGS (lightweight)	
Plain wye (2 ½ F × 2 ½ M × 2 ½ M)	$134-143.00
Gated wye (2 ½ F × 2 ½ M × 2 ½ M)	614.00
Water Thief (2 ½ F × 1 ½ M × 2 ½ M × 1 ½ M)	619-647.00
Leader Line Gated Wye (2 ½ F × 1 ½ M × 1 ½ M)	284.00
Clappered Siamese (2 ½ M × 2 ½ F × 2 ½ F)	185-250.00
Plain Siamese (2 ½ M × 2 ½ F × 2 ½ F)	134-168.00
EXTINGUISHERS	
ABC (20A:120 BC rating) 20 lb.	$62-132.00
Halon 1211 (2A:60 BC rating)	128-148.00
CO^2 (10 BC rating) 20 lb.	130-156.00
Class D	256.50
Stored Pressure-Water Type (2A rating)	44-49.50
Stored Pressure-Water Type AFFF (3A:40B rating)	100.00
GAS DETECTORS (Portable)	$180-539.00
PORTABLE FOLDING WATER TANKS	
Hypalon 2002	
1000 gal	$895.00
1500 gal	1080.00
2100 gal	1200.00
2500 gal	1325.00
3000 gal	1525.00
4000 gal	1800.00
Duck	
1000 gal	650.00
1500 gal	810.00
2100 gal	920.00
2500 gal	990.00
3000 gal	1115.00
4000 gal	1365.00

SELECTED FIRE FIGHTER SALARY RANGES BY REGION OF COUNTRY AND POPULATION RANGE (1981)

Population Range	City	Entrance*	Maximum**
	Northeast		
Over 1,000,000	Philadelphia, PA	$16,666	$18,952
250,000-499,999	Buffalo, NY	12,768	16,252
100,000-249,000	Cambridge, MA	13,700	17,200
	Paterson, NJ	13,000	18,100
50,000-99,999	Cranston, RI	13,883	15,608
	East Orange, NJ	15,500	19,001
	Portland, ME	10,386	12,151
	Wilkes Barre, PA	15,450	16,500
25,000-49,999	Lexington, MA	12,921	16,742
	Ridgewood, NJ	18,554	22,100
	Torrington, CT	12,045	13,139
	White Plains, NY	15,510	20,252
10,000-24,999	Augusta, ME	10,888	12,968
	Barrington, RI	12,957	15,102
	Canandaigua, NY	12,188	15,543
	Duquesne, PA	16,516	16,516
	Northcentral		
Over 1,000,000	Detroit, MI	21,184	26,296
500,000-1,000,000	Cleveland, OH	18,021	19,021
	Indianapolis, IN	13,500	18,323
	Milwaukee, WI	15,518	18,309
250,000-499,999	Minneapolis, MN	15,772	24,778
	Toledo, OH	19,034	20,074
	Wichita, KS	14,177	17,696
100,000-249,999	Lincoln, NE	14,384	17,032
	Madison, WI	17,103	18,827
	Rockford, IL	12,045	20,271
	Youngstown, OH	13,713	16,066
50,000-99,999	Euclid, OH	18,850	20,910
	Green Bay, WI	14,490	19,840
	Lawrence, KS	12,055	15,491
	Mt. Prospect, IL	14,200	21,110
	Sioux Falls, SD	15,164	17,834
25,000-49,999	Madison Hgts, MI	16,950	19,300
	Mankato, MN	14,052	16,836
	St. Charles, MO	13,529	16,195
10,000-24,999	Boone, IA	13,644	16,524
	Mitchell, SD	10,352	12,560
	Noblesville, IN	10,015	11,358
	Norfolk, NE	11,844	15,288
	Olathe, KS	12,240	14,601
	Plymouth, MI	15,500	24,162
	Stow, OH	15,787	18,970
	South		
Over 1,000,000	Houston, TX	18,840	23,346
500,000-1,000,000	Dallas, TX	17,544	20,148
	Jacksonville, FL	12,948	17,652
	New Orleans, LA	11,964	16,348

Population Range	City	Entrance*	Maximum**
250,000-499,999	Nashville/Davidson, TN	12,324	16,968
	Norfolk, VA	11,316	14,976
	Tampa, FL	13,202	15,620
100,000-249,999	Greensboro, NC	11,472	17,736
	Hampton, VA	10,570	14,385
	Hollywood, FL	15,226	19,548
	Little Rock, AR	11,500	15,400
	Lubbock, TX	13,229	18,158
	St. Petersburg, FL	12,596	17,353
50,000-99,999	Albany, GA	10,731	14,997
	Fargo, NC	17,088	18,780
	Gainesville, FL	12,352	15,407
	Norman, OK	10,862	13,827
	Odessa, TX	13,296	16,620
	Owensboro, KY	11,846	13,680
25,000-49,999	Chapel Hill, NC	10,750	14,406
	Danville, VA	11,606	16,328
	Lauderhill, FL	12,646	17,439
	Meridian, MS	10,349	13,624
	Muskogee, OK	8,886	12,204
	Rome, GA	10,980	15,446
	Weirton, WV	15,223	16,656
10,000-24,999	Greeneville, TN	10,399	12,712
	Natchitoches, LA	9,674	9,674
	Newport, KY	10,501	10,501
	Staunton, VA	9,087	12,404
	Thomaston, GA	10,500	12,084
	Union, SC	10,100	11,918
	Vero Beach, FL	11,445	13,658
	West		
Over 1,000,000	Los Angeles, CA	18,406	23,532
500,000-1,000,000	Phoenix, AZ	15,319	20,155
	San Francisco, CA	20,424	23,640
250,000-499,999	Portland, OR	15,683	24,273
	Tucson, AZ	15,564	20,412
100,000-249,999	Glendale, CA	17,130	22,956
	Pueblo, CO	14,520	18,588
	Riverside, CA	16,860	22,044
50,000-99,999	Bellevue, WA	18,288	24,072
	Boise City, ID	15,240	18,528
	Glendale, AZ	15,852	20,280
	Provo, UT	13,254	16,575
	Salem, OR	14,292	20,232
	Santa Barbara, CA	14,768	19,942
25,000-49,999	Corvallis, OR	14,172	17,232
	Manhattan Beach, CA	15,840	19,128
	Missoula, MT	13,140	16,008
	Olympia, WA	18,528	22,920
	Orem, UT	13,201	20,317
	Roswell, NM	11,448	13,356
10,000-24,999	Ashland, OR	15,582	17,244
	Casa Grande, AZ	13,788	17,724
	Gresham, OR	16,020	20,916
	LaVerne, CA	17,220	20,424
	Las Vegas, NM	8,448	10,564

Population Range	City	Entrance*	Maximum**
	Lompoc, CA	16,398	19,860
	Thornton, CA	14,964	14,964
	Tullahoma, CA	10,170	11,584
	Twin Falls, ID	—	15,300

*Annual base salary of a full-time fire fighter during the first 12 months on the force.

**Maximum annual base salary paid a full-time employee not holding any promotional rank.

Source: Gerard J Hoetmer, "Table 3/1, Police, Fire, and Refuse Collection and Disposal Departments: Personnel, Salaries, and Expenditures for Cities over 10,000: 1981," in *The Municipal Year Book 1982*, (Washington, DC: International City Management Association, 1982), pp. 95-146.

Employment and Salaries for Canadian Fire Departments

Source: "Employment and Salaries for Canadian Police and Fire Departments," in *The Municipal Year Book 1982* (Washington, D.C.: International City Management Association, 1982), pp. 147-49.

Fire departments in 163 Canadian municipalities reported data for this table. All employment and salary figures are as of 1 January 1981 and are reported in Canadian dollars. Salary figures are not reported when the entire salary is dependent on a variable. Probationary fire personnel are those who take training with the intention of becoming first class fire fighters. First class fire personnel are those who have completed basic training in the first degree of permanent status. Leaders (...) indicate no response because 1) data were not reported, 2) information is not applicable, or 3) the city does not provide the given service. Data were compiled by the Federation of Canadian Municipalities from reports furnished by participating lmunicipalities; these figures do not represent any attempt to compare positions with respect to descriptions, areas of responsibility, and reporting relationships.

KEY

Municipal classification
b —borough
c —city
d —district
r —region
t —town
tp —township

Salary and employment
† —average of a range
# —1980 salaries

EMPLOYMENT AND SALARIES FOR CANADIAN FIRE DEPARTMENTS

	No. of Employees			Salaries ($)	
Municipality	Probationary	First class	Total, all ranks	Probationary	First class
		Over 250,000			
Durham, Ont. r	....	...	......	....	....
Edmonton, Alta. c	30	241	645	18,460	25,662
Etobicoke, Ont. b	36	251	393	15,470	23,914
Hamilton, Ont. c	15	270	300	18,952	27,075
Laval, Que. c	....	95	145	....	26,022
London, Ont. c	26	160	321	14,885	22,900

	No. of Employees			Salaries ($)	
Municipality	Proba- tionary	First class	Total, all ranks	Proba- tionary	First class
Mississauga, Ont. c	....	...	300	15,174#	23,345#
Niagara, Ont. r	....	...	......	....	....
Peel, Ont. r	....	...	......	....	....
Scarborough, Ont. b	10	269	420	17,542	26,988
Toronto, Ont. c	....	821	1,300	18,676	26,677
Toronto Metro, Ont. r	....	...	......	....	....
Vancouver, B.C. c	8	521	800	19,056	27,228
Waterloo, Ont. r	....	...	......	....	....
Winnipeg, Man. c	....	708	983	17,836	25,428
		100,000-249,999			
Burnaby, B.C. d	31	119	219	21,781†	27,498†
Halifax, N.S. c	....	194	282	9,200	19,871
Halton, Ont. r	....	...	......	....	....
Kitchener, Ont. c	1	123	180	13,945#	23,241#
Longueuil, Que. c	0	36	64	15,890#	25,214#
Oshawa, Ont. c	2	109	......	19,318	25,419
Quebec, Que. c	....	227	364	....	23,709
Richmond, B.C. tp	....	115	166	19,056	20,424
St. Catharines, Ont. c	0	91	158	17,073#	22,766#
Saskatoon, Sask. c	7	25	249	....	....
Sudbury, Ont. r	....	...	......	....	....
Thunder Bay, Ont. c	9	94	179	17,211	25,688
York, Ont. b	6	122	191	20,068	26,759
York, Ont. r	....	...	......	....	....
		50,000-99,999			
Beauport, Que. t	....	...	......	....	....
Brantford, Ont. c	9	71	114	....	....
Brossard, Que. t	....	...	48	....	....
Chicoutimi, Que. c	....	...	......	....	....
Dartmouth, N.S. c	0	95	130	11,132	19,500
Delta, B.C. d	1	110	......	19,056	27,228
Gatineau, Que. t	0	44	44	14,834	24,154
Gloucester, Ont. c	0	45	76	16,000	26,666
Guelph, Ont. c	1	72	100	....	....
Hull, Que. c	8	54	94	18,718	26,740
Kamloops, B.C. c	....	...	92	18,994	27,135
Kelowna, B.C.	....	...	80	19,060	27,228
Kingston, Ont. c	2	66	97	16,907	24,361
LaSalle, Que. c	4	64	90	15,365	25,605
Lethbridge, Alta. c	4	32	115	17,908	22,953
Markham, Ont t	12	23	71	14,000	25,000
Montreal-Nord, Que c	....	...	89	....	27,261
Nepean, Ont. c	5	53	110	16,080	26,800
Niagara Falls, Ont. c	2	56	102	15,716	24,556
North Bay, Ont. c	....	55	76	....	....
North Vancouver, B.C.d	2	74	139	19,056	27,228
Oakville, Ont. t	....	...	72	....	....
Prince George, B.c. c	4	22	......	19.056	26,748
Saanich, B.C. d	6	...	101	19,056	27,552
St-Hubert, Que. t	....	...	27	13,631#	22,144#
St-Leonard, Que. c	0	52	75	16,711	23,874
Sault Ste. Marie, Ont. c	2	50	99	17,171	24,530
Strathcona, Alta. co	2	16	30	16,940	24,200

	No. of Employees			Salaries ($)	
Municipality	Proba-tionary	First class	Total, all ranks	Proba-tionary	First class
Sudbury, Ont. c	....	...	......	16,652	25,230
Trois-Rivieres, Que. c	....	...	......	....	....
		25,000-49,999			
Anjou, Que. t	1	15	27	16,952	26,104
Belleville, Ont. c	1	41	61	15,706	24,163
Boucherville, Que. t	....	...	......	....	....
Brandon, Man. c	0	31	50	16,510	22,910
Chateauguay, Que. t	....	...	......	....	....
Chatham, Ont. c	4	33	55	17,360	24,800
Corner Brook, Nfld. c	....	38	38	....	18,972
Cornwall, Ont. c	0	31	53	15,082#	22,170#
Dollard-des-Ormeaux, Que. t	....	20	24	14,993	24,968
Drummondville, Que. c	....	...	......	....	....
Fort McMurray, Alta. c	13	25	63	20,903	26,129
Fredericton, N.B. c	1	39	101	12,500	18,922
Kington, Ont. tp	....	1	......	....	21,200
Lachine, Que, c	2	62	64	19,570	24,463
Matsqui, B.C. d	....	...	......	....	....
Medicine Hat. Alta. c	1	26	61	18,225	24,300
Newcastle, Ont. t	....	2	3	....	16,450
Newmarket, Ont. t	6	7	22	16,603†	25,590
New Westminster, B.C. c	1	24	86	19,056	27,228
North Vancouver, B.C. c	....	...	53	19,056	27,228
Outremont, Que. c	....	39	51	....	25,686
Pickering, Ont. t	4	17	36	17,490	25,911
Ponte-Claire, Que. c	4	46	54	15,704	26,173
Port Coquitlam, B.C. c	....	...	39	19,056	27,768
Prince Albert, Sask., c	2	20	47	15,576†	23,604
Red Deer, Alta. c	1	15	70	18,345	24,460
Repentigny, Que. t	....	...	......	....	....
Richmond Hill, Ont. t	....	17	26	14,000	24,850
Rimouski, Que. c	0	6	7	11,804	24,128
St. Albert, Alta. c	....	...	42	18,165	23,902
St-Eustache, Que. t	....	...	......	....	....
St. Thomas, Ont. c	0	22	28	16,514	23,316
Salaberry-de-Valleyfield, Que. c	....	...	......	....	....
Sarnia, Ont. c	....	...	......	....	....
Stoney Creek, Ont. t	2	6	8	16,466	23,553
Stratford. Ont. c	2	29	38	14,801	22,770
Sydney, N.S. c	2	31	60	16,244	16,931
Timmins, Ont. c	2	22	40	14,066	20,094
Vaughan, Ont. t	2	12	63	18,748	26,784
West Vancouver, B.C. d	6	30	73	19,056	27,228
Woodstock, Ont. c	0	26	37	17,360	24,800
		10,000-24,999			
Ajax, Ont. t	11	11	26	16,255	27,091
Amherst, N.S. t	....	...	6	....	17,840
Ancienne Lorette, Que. t	....	...	......	....	....
Aurora, Ont. t	1	1	3	....	19,590†
Baie-Comeau, Que. t	....	4	5	14,508	21,216
Bathurst, N.C. c	....	...	......	....	....
Beloeil, Que. t	....	6	7	....	21,580
Blainville, Que. t	....	1	......	....	19,100

	No. of Employees			Salaries ($)	
Municipality	Probationary	First class	Total, all ranks	Probationary	First class
Brockville, Ont. c	....	11	27	....	23,196
Campbell River, B.C. d	2	12	20	21,780†	27,228
Camrose, Alta. c	....	...	......	....	....
Charlottetown, P.E.I. c	....	...	......	....	....
Cobourg, Ont. t	0	4	8	13,000	20,000
Collingwood, Ont. t	0	7	11	13,653†	20,225
Cranbrook, B.C. c	0	21	25	19,056	27,228
Cumberland, Ont. tp	0	6	12	13,975	21,500
Dorval, Que. c	0	22	34	14,939	24,898
Dundas, Ont. t	....	12	14	....	21,191#
Elliot Lake, Ont. t	....	...	15	20,740	24,603
Esquimalt, B.C. tp	....	...	......	....	....
Grande Prairie, Alta c	1	7	21	18,460	24,310
Greenfield Park, Que. t	....	...	......	....	....
Hauterive, Que. t	....	...	......	....	....
Kanata, Ont. c	0	7	21	13,500	22,500
Kitmat, B.C. d	1	15	19	20,199	28,861
La Baie, Que. t	....	...	......	....	....
Lachute, Que. c	....	...	......	....	....
La Tuque, Que. t	....	...	......	....	....
Leamington, Ont. t	....	...	......	....	....
Levis, Que. t	....	...	......	....	....
Lindsay, Ont. t	0	6	16	15,942	24,542
Magog, Que. c	0	3	3	17,056	24,076
Mascouche, Que. t	....	...	......	....	....
Matane, Que. t	....	...	......	....	....
Midland, Ont. t	1	8	13	14,669	22,920
Mirabel, Que. t	1	1	2	....	18,500
Mount Pearl, Nfld. t	....	...	......	....	....
Oak Bay, B.C. d	1	17	28	19,056	27,268
Orangeville, Ont. t	....	...	......	....	....
Owen Sound, Ont. c	....	...	32	14,985†	23,080†
Pembroke, Ont. c	0	11	20	13,767#	19,149#
Port Alberni, B.C. c	0	16	24	20,292†	27,248†
Port Colbourne, Ont. c	....	...	......	18,215#	21,595#
Port Moody, B.C. c	5	...	18	19,056	27,228
Portage-la-Prairie, Man. c	1	6	10	13,701	16,340
Powell River, B.C. d	....	17	17	....	25,140†
Prince Rupert, B.C. c	1	4	24	19,000	27,230
Riverview, N.B. t	0	12	......	10,920	16,172
St-Bruno de Montarville, Que. t	....	...	......	....	....
St-Jerome, Que. c	....	19	29	....	23,522
St-Lambert, Que. c	....	...	......	....	....
Sandwich West, Ont. tp	....	5	7	....	22,250
Sarnia, Ont. tp	13	2	17	17,994	23,464
Shawinigan-Sud Que. t	....	...	......	....	....
Sorel, Que. c	....	...	......	....	....
Terrace, B.C. d	....	...	9	16,608†	28,808†
Thetford Mines, Que. t	....	...	......	....	....
Thorold, Ont. c	2	2	......	17,293	24,704
Tracy, Que. t	....	...	......	....	....
Trenton, Ont. c	....	...	10	16,791	24,261
Valley East, Ont. t	....	10	10	....	22,999
Wallaceburg, Ont. t	....	8	15	....	....
White Rock, B.C. c	4	5	12	21,780†	27,228

Running a Fire Department in 1982

by
Douglas Forsman, Chief
Champaign Fire Department
Champaign, Illinois

Being a fire chief in 1982 was a rewarding, although often stressful occupation, as pursuing the profession in the industrial midwest during economic hard times often made the job difficult. As I reflect on the past year in my medium-sized community, certain key issues come to mind, some of which may have also affected other communities in greater or lesser degrees.

Social and economic issues impact the operation of any organization, and a municipal fire service is no exception. Although the delivery of fire and emergency medical services is regarded by most people to be a basic municipal function, it has not been spared the scrutiny or red ink generated by today's economic climate. Although the review and adjustment processes have been a continuing part of fire service management, public policy decisions within a depressed economy and a generally conservative political climate have brought about close examination of all public programs.

Fiscal restraints have been a serious reality in the form of reduced management for fire and other municipal services. Steady or decreasing tax revenues have placed demands on fire service managers to make tough decisions about staffing, capital purchases, and operating expenses. Fire chiefs are finding it necessary to deal with alternatives that favorably affect the income side of the ledger in order to maintain minimum levels of service.

The following issues, the significant ones faced by the Champaign Fire Department in 1982, were also faced by many other fire departments in 1982.

- Many employee groups, whether formal or informal, have recognized the necessity to bring their compensation concerns in line with municipal resources. These employee groups have generally concentrated their negotiation efforts on non-financial benefits. High unemployment and a decline in pro-labor sentiment have contributed to this general softening of labor's demands on local governments.

  Fire service managers have also had to deal with modern work ethics. Many entry employees have realized that the probability of promotion will be less than 20 percent for their entire career. Their demands for participation in and input to the organization must be recognized and met through innovative management techniques.
- Fire chiefs have begun to re-evaluate policy and procedures as they relate to the safety and physical fitness of fire service personnel. This re-evaluation involves the close examination of each procedural decision and equipment purchase to determine its impact upon employee safety. This safety/fitness awareness, which began in earnest in the mid-70s, reflects an increased concern upon the part of many fire service administrators about the duration of life, potential disability, and cost of accidents. Although it requires a major effort each year, conscientious fire service administrators have consistently taken the time to keep up with safety technology and to investigate proven, workable physical fitness programs for their personnel. Unfortunately, this effort is not without resistance since doubt and suspicion exist among some employees whenever programs or equipment reflect a change that adds new complexity to the work environment.
- Major equipment purchases created several dilemmas for the fire service manager. Competition for the apparatus purchasing dollar among manufacturers was predictably high in a time of low economic activity. The potential purchaser was presented with a myriad of gimmicks, body materials, finishes, etc., that promised to make the

apparatus more useful and to extend its service life. However, close scrutiny of most changes indicated that none were substantive in relation to the basic technology of fire apparatus.

The more pertinent decision faced by most fire service administrators was the option of retaining and subsequently repowering existing apparatus as opposed to purchasing a totally new replacement. Although there is not significant data available on the success of repowering projects, they continue to be very popular and appear to be very cost-effective. The overall revenue picture of the local government was the primary factor in many of these decisions.

- The fire service has not escaped the impact of computer technology. Computer technology continued to be attractive to fire service managers as a way to process an increased volume of paperwork and to generate information. Selecting the computer system and appropriate software, however, is generally a scary project, even for the "computer-informed administrator." Both the rapid changes in computer technology and the "hard sell" make decisions relating to high-tech purchases difficult and worrisome.
- The areas of public firesafety education and code enforcement continued to compete favorably with fire suppression for the local government dollar. Impressive data and an array of success stories have reemphasized the contribution that programs in each area make in the management of the local fire problem. Many fire service administrators have combined these two functions with fire suppression duties more vigorously than ever before. The results have been an increase in productivity and an attitude of re-dedication on the part of most employees to firesafety education and code enforcement. The use of non-fire service resources in these areas has become an important element to the success of some programs. Fire service administrators today are working regularly with fire protection engineers, education professionals, media specialists, and others whose contributions are vital to the success of fire prevention and public education efforts.
- Fire service managers have had to justify the cost of fire services within local government budgets and to maintain high quality relations with city administrations and elected bodies. Concerned managers constantly looked for ways in 1982 to increase productivity and properly measure service and performance. Where these efforts have been unsuccessful, alternatives have included replacement of management personnel and experimentation with radical change. Under such close examination, some traditional methods and even taboos have given way to the necessity of maintaining good relations and a strong budget position for the fire service.

The year 1982 was a difficult time to administer any local government cost center as the problems seemed to be many and the solutions few. It was, however, satisfying to observe the continued success of public firesafety education programs as they achieved new degrees of measured success. These programs, together with the positive attitude shown by many fire service employees, have begun to make a difference in the firesafety behavior of Americans. The efforts made by administrators to support quality fire prevention paid dividends in 1982, and should continue to do so in the future.

Funds and Resources for the Fire Service

Like all government services, fire departments are discovering that competition for funding is becoming increasingly fierce. The fire chief is trapped between a cost-conscientious city or county government and a demanding public. High insurance rates and taxes, plus diminishing local resources, have made citizens more aware of the need for fire protection. At the same time, new hazards and dangers from chemicals transportation and natural incidents are causing citizens to demand more protection from these potential disasters.

Not every fire department will find the "pot of gold" it's looking for, but it can, through sufficient research and work, get assistance for improving its operation or for introducing additional services. Large federal grants and free-flowing financial aid are not as abundant as they used to be. In fact, they were never really plentiful. Only those who researched their needs and sources and matched the two were rewarded with grants, and then, only after months and sometimes years of work.

Assistance is often considered only as financial aid, but assistance can also mean people. Volunteers who will help you complete your task, formulate your plans, or even help you locate other sources of assistance, including money, are available.

Assistance can also mean technical advice. In some cases, the federal government provides community service leaders with technical assistance. This assistance can be by phone or on-site visits for a few hours up to several days. In other cases, the federal government provides communities with technical assistance through contracts with other local people when the expertise is not available on the federal level.

Assistance can also mean materials and publications that will allow you to accomplish what you need or learn more about other similar programs that can be implemented in your fire department.

Information on federal programs of interest to you may be obtained from a regionally located Federal Information Center. Information Center staff can help you locate the closest and/or most appropriate federal agency that handles the program areas of interest to you. These centers are operated by the U.S. General Services Administration.

You may contact a center by phone, personal visit, or letter. Each center is a focal point for information about the federal government. When you are seeking information, the center will either provide you with the answer or direct you to an agency representative who can help you. Many centers have toll-free telephone numbers or local phone numbers for long-distance locations.

A complete listing of all federal assistance programs and additional information can be found in the *Catalog of Federal Domestic Assistance* which is available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402 for $20.00 per copy. The catalog covers all federal assistance programs; however, it takes a knowledge of local conditions and some imagination to be able to select those programs that are appropriate to local conditions. For example, the availability of federal funds for fire protection of waterfront properties may depend upon the direction in which the proposal is written. There may be several programs that could be used depending on whether the need is for additional energy sources in the area, a reduction of unemployment, or an improvement of the environment, for example.

The *Catalog* is published annually, using the most current data available on the status of programs at the time the information is compiled. The basic edition of the *Catalog*, which is usually published in May, reflects completed congressional action on program legislation. A catalog update is published in December and reflects completed congressional action on the President's budget proposals and substantive legislation as of the date of compilation. The update must be retained and used along with the basic edition in order to obtain the most current information on program revisions.

The federal government is under mandate from the citizens, the Congress, and the President to review all programs with a view toward reducing federal government expenditures. It is safe to assume that there will continue to be less federal funding available in the future and some of the programs listed in the *Catalog* will not be able to fund your requests. This is a situation you should consider as you apply for funds.

The National Fire Protection Association publication, *Funding and Sources for Fire Departments* is available from the NFPA to assist fire departments in locating sources of funding and in preparing proposals for assistance. It contains information on proposal writing and types of federal programs that may have funds available for fire services as well as sources of private funding assistance.

Innovative Trends in Delivering Public Fire Protection

Consolidation

Consolidation of fire departments, or regionalization, is a controversial subject in America. But since consolidation has many advantages, the pressure to merge fire departments is increasing. The major advantages are cost reduction and more efficient use of resources.

Some noteworthy examples of major consolidation of fire services in the United States are: Los Angeles County, California, the metropolitan Dade County consolidation in Miami, Florida, the metropolitan regionalization of the suburbs around Atlanta, Georgia, Houston, Texas, and Nashville, Tennessee, and most recently, Orange County, Florida. There are also some noteworthy exceptions. For example, in the Boston area, there are over 30 metropolitan fire departments, each providing their town or city with services at somewhat duplicative costs. Consider the price that is being paid by these independent cities and towns. Under Proposition 2½, Boston has had to lay off one-third of its fire fighters. Fortunately, the Boston metropolitan area has functional consolidation in the form of an excellent mutual aid plan whereby the cities and towns send apparatus and equipment into each other's territories to assist in fire fighting. If it had not been for mutual aid, the Boston Fire Department with its reduced manpower would have been hard-pressed to handle several simultaneous multiple alarms that occurred in 1982.

Probably the most controversial consolidation discussions involve police and fire combinations. It is argued that a consolidated police and fire department, with cross-trained personnel, is a cost-effective, money-saving move for the municipality. Almost every experiment of this nature in the United States has failed for one reason or another. However, the consolidation of building inspection departments and fire marshal offices has generally been cost-effective and accepted. The most effective consolidations occur when the program aspects of the various departments have similar missions, such as safety code enforcement, inspection, construction plan approval, and occupancy certification.

The next level of consolidation, namely "functional consolidation," involves the consolidation of functions that are common to fire departments and other municipal departments or agencies, but does not involve the actual legal merger of the various departments. Functional consolidation is widely used to cut costs. Central purchasing, as practiced by the Washington, DC Metropolitan Council of Governments, is an example of cost-effective, functional consolidation. Another example is automatic mutual aid and the consolidation of dispatching and fire alarm offices in a region (such as Fairfax, Alexandria, and Arlington Counties in Virginia). Some of these consolidations involve initial start-up costs which must be provided through the enactment of legislation or bonding. Other areas that could be involved are administrative services, training, maintenance, fire prevention and investigations, and building code enforcement.

Some Unusual Legal Constraints

The multitude of jurisdictions and the diversity of state and local laws within the United States can create obstacles to cost-effective improvements in the delivery of public fire protection. For example, in New Jersey there is a law that prohibits budget expenditures from exceeding a 5-percent increase over the previous year's budget. This means a city can have a multi-million dollar surplus of revenues, but cannot increase its expenditures more than 5 percent of the previous year's budget. Another unique New Jersey State law prohibits independent fire districts and volunteer fire departments from setting up savings accounts in order to save for future projects. Because fire districts are not allowed to set aside money which can grow and earn interest for future expenditures, the districts have to borrow the money from a bank when they need the funds and then repay the bank.

Alternative Funding Sources

(Excerpts from "A Study of Alternative Funding Sources for the Fire Service" by the National Conference of Counties, 1980.)

Some of the alternative revenue sources for fire protection funding that are now being considered in the United States are summarized below:

1. **Fire Inspection and Permit Fees.** The issuance of a fire permit regulates businesses that use, store, or manufacture hazardous materials, use hazardous processes, or by their nature of business expose large groups of people to such hazards. The fee charged helps pay for the additional level of service provided by the fire department due to the need for inspections to regulate the hazard. The concept is that such activities should pay a proportionate share of the extra services required by the fire department over and above the basic service level provided to the rest of the community. As in many businesses, the fee charged should reflect not only the actual wages, but also the overhead costs. An example is the city of San Jose, California which reportedly recoups a substantial percent of its entire fire prevention bureau budget through such fees.

2. **Subscription Services.** Because of the reduced budgets available to municipal governments, the practice of subscription services, popular in the 1700s, is being revived in many municipalities within the United States. The current trend started 20-25 years ago with ambulance or rescue services. Individual property owners or citizens would subscribe to the ambulance or rescue service on an annual subscription basis. The practice of subscription services has expanded to a few fire departments in the United States known as "private fire departments." The idea is the same; namely, that the citizen subscribes to the services of the fire department for a nominal fee and the fire department will respond to any fires or calls for emergency service from that particular property owner. As expected, those citizens who do not choose to subscribe to the fire department services are left without fire protection and there have been cases where private fire departments have allowed buildings and homes to burn to the ground because the property owner had failed to subscribe to the service.

3. **Insurance Franchise Fees.** The insurance franchise fee is based on the premise that a municipal corporation or municipality has the authority to legislate certain services for the public welfare. Since the protection of life and property is in the best interest of the public and a fire department finds itself providing protection for property that is insured, it is theorized that the insurance company's financial interests are being supported by the tax-paying municipal citizen. Further, the theory assumes that, because rubbish collection, taxi services, ambulance services, and now cable TV are regulated by the municipality, the selling of insurance with the excess profit accruing to the benefit of the municipality should likewise be controlled by the municipality. The insurance franchise is put out on bid. The insurance company that wins the bid then pays the city or the municipality a percentage of the premiums collected and these fees are used to help support the fire department.

4. **Municipal Fire Insurance.** An approach similar to the property insurance concept is for the fire insurance to be underwritten by the city or municipality in which the insured property owners are located. Under this concept, local government would write the policy, set the premium, and accumulate a surplus to cover any claims. Although discussed from time to time in the United States, there is no known municipality that has chosen this approach to increasing municipal revenues.

5. Fire Flow Charges. This method involves placing a fire protection charge on those occupancies that have a disproportionately high fire flow water demand such as warehouses, hazardous occupancies, etc. Because current fire protection engineering "state-of-the-art" allows for the estimation of required fire flow for various structures and occupancies, there is available a formula for charging a fee over and above the property taxation. Although this theory may be innovative and have a firm foundation in fire protection technology, it must be accepted by property owners and local political leaders in order to be legislated into ordinances or regulations that create the fee structure.

6. Private Enterprise Partnership. In this approach, a mutual partnership is developed between the city and a private corporation, usually to build an industrial park or a new development of some sort. The investors purchase the land and the city provides the site improvements, water supply, and so forth. In turn, the city receives a percentage share of the project profits. In addition to the profit-sharing concept, the developer may build a fire station on the project site and lease it back to the city for a nominal fee each year. Informal agreements occur wherein an industrial complex will provide its own fire

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What is the Price Tag for a Human Life?

by Tom Tugend, UCLA Public Information Office

(Reprinted with permission from *The Engineer of California*, May 1982)

How much is a human being worth and what is society's price tag to save a single life?

Put another way, what risks and costs are we willing to assume for the benefits of electricity, plane travel, chest X-rays, clean air or earthquake-resistant homes?

The answers go at once to the basic values of a people and to the most routine actions of every citizen.

When a man buys a retread instead of a new safety tire or puts off a medical checkup to save on doctor bills, he is weighing risks and costs against safety and benefits. So is the government when it spends $200,000 to reduce the national traffic toll by one fatality, but $5 million to save the same statistical life from a nuclear reactor accident.

At UCLA, a team of experts in engineering, psychology, economics, sociology, political science and decision analysis has been working for ten years to develop rational guidelines for what have been mainly intuitive, emotional or political decisions. In some 40 reports for the National Science Foundation and the old Atomic Energy Commission, the group has been trying to qualify the risks of dam failures, meteorite impacts, and earthquakes and the cost benefits of water quality, use of chemicals and airplane transport.

Current studies explore methods for more effective prevention by local and state agencies of hazardous situations, such as the chemical pollution found at Love Canal.

The leader of the group is Prof. David Okrent of the UCLA School of Engineering and Applied Science, a national authority on nuclear reactor safety who has broadened his research into the overall field of risk management.

Granting the ethical and moral complexities of putting dollar signs on a specific human life, the UCLA studies deal rather with the broad statistical odds and risks facing large numbers of people.

For instance, notes Dr. Okrent, nobody asks the price for rescuing one particular girl trapped in a deep well shaft. For the risk manager, however, the question is how many such accidents occur a year and how much money the voters might allot to put protective covers on all wells.

Amidst the detailed facts and figures, some broad observations can be drawn from the UCLA reports:

- Life will never be free of hazards and no country is rich enough to eliminate all risks. If too much of the national wealth goes for risk elimination, less may be available for suppression capability, including apparatus and manpower, and as a "good neighbor" extend support on a mutual aid basis to the surrounding community. There are numerous examples of this type of informal partnership between private industry and the local government for providing municipal fire protection.

7. Stand-by Fees. Some municipalities in the United States are charging for the fire department personnel and equipment required to stand-by at non-emergency or post-emergency incidents. Examples would be automobile accidents or trucking vehicular accidents that require long periods of stand-by while wreckers are removing the debris or the merchandise from the scene. Another example would be the fire watch at large public functions such as circuses or sporting events.

8. Fire Protection Contracts. A widespread practice in the west involves the extension of services beyond the municipality for a specified contract fee. In some cases, the fees are used to supplement existing levels of service, and in others they are used to hire additional personnel and equipment for the mutual benefit of the contracting parties.

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general productivity and ultimately for full employment, housing and health care. Since a people's average life expectancy generally goes up with the standard of living, a balance has to be struck between the cost of safety measures and the benefits of a strong economy.

- The price society is willing to pay to save one life or, as Dr. Okrent puts it, "defer a premature death," varies enormously. Life's dollar value depends on where the hypothetical victim lives, what kind of work he does, the impact of pressure groups and changing social priorities.

  According to figures compiled in 1975, the cost of averting a single fatality through a general cervical cancer screening program for women was $25,000; through improved median road barriers, $230,000; through upgraded coal mine safety, $22 million; and through safer radioactive waste disposal, $100 million.

A similar British study showed that England spent $10,000 on accident prevention to save the life of an agricultural worker, but $20 million for a high-rise apartment dweller.

For the altruistically-minded, the best global bargains in life saving are to spend $100 for immunization in Indonesia or send $5,000 in relief aid to a famine-stricken country.

- If our priorities and payoffs in allocating life-saving money are as askew as the figures indicate, "we are, statistically speaking, killing people whose premature deaths could be prevented by a better allocation of resources," says Dr. Okrent.

  "Pressure groups which concentrate solely on the complete elimination of one particular risk, without looking at the total picture, must bear a responsibility for such misallocations," he adds.
- Most people are largely ignorant of risk ratios, such as the relative safety of plane travel over car driving. On the other hand, society in effect condones some known risks, such as drunk driving, which accounts for half the nation's traffic fatalities.
- Some risks must be accepted to meet essential needs. Enough drinking water has to be supplied, even at the price of an occasional dam failure. Society may be unwilling to accept the same risk for merely beneficial purposes, such as sprinklering lawns, and even less for peripheral needs, for instance, to operate decorative water fountains.

Systematic research into risk management is barely a decade old, says Dr. Okrent, and the interplay of social, political, economic, technological and ethical factors demands much more widespread and intensive study. He advocates deeper involvement by state agencies, backed by a central risk management information supported by the federal government.

9. Donations and Solicitations. This form of financing fire protection is very traditional in the United States in rural and suburban areas. In Delaware, for example, there are approximately 100 fire departments, and all but three are supported by solicitation and donation of funds.

10. Reimbursement for Extraordinary Expenses. In certain areas of the United States, there are ordinances and laws requiring the reimbursement of the fire department for the use of large quantities of foam or other expensive equipment to fight fires in industrial or hazardous occupancies. At least one municipality has gone a step further and designated a city employee as a "Risk Manager" whose responsibility is to respond to the scene of any incident where there is the possibility of violations. If the Risk Manager determines that this is the case, he will assess the liability of the party responsible and bill the owner for the cost of handling the incident.

11. Unnecessary Alarm Fees. There is increasing discussion within the American fire service that expenditures for unnecessary alarms or false alarms should be passed on to the property owner. Some cities have an ordinance that charges a fee anytime its fire department makes over three unnecessary alarms to any private fire alarm system.

12. Fire Brigade Training Fees. In some parts of the United States, fire departments are charging fees for training private fire brigades. In some areas, one municipality's training division will provide training for another municipality's recruit fire fighters on a fee basis.

13. Insurance Salvage Fee. This unusual concept probably has its origin in maritime salvage law. There is some support for the idea that the value of the property saved by the fire department should be a basis upon which the fire department can charge the insurance company a percentage fee for helping to save that property. The salvage fee itself could be a percentage amount and could be applied on a sliding scale according to the property value. The concept has the advantage of rewarding a fire department for its performance and shifting some of the burden of the cost of fire protection to the insurance company. If the fire department is inefficient, the insurance company pays a larger loss.

14. Fines. These are levied as a result of a violation of a fire-related standard or code.

15. Public Service Call Fees. These would be fees for services performed that are nonemergency in nature such as lockouts, pumping of cellars, animal rescue, and aerial ladder service calls.

Code Enforcement Programs

About This Study

The information included in "Code Enforcement Programs" is condensed from the *Code Administration Resource Directory* that was prepared by the International Association of Fire Chiefs under a grant from FEMA/USFA. The purpose of the report is to explain and identify key resources to help fire chiefs and government officials plan and implement code enforcement programs. The programs in the communities represented can be used as general benchmarks for code enforcement performance and are valuable for comparing levels of effort and techniques. Many aspects of these enforcement strategies are transferable to a variety of circumstances. The criteria for selecting the programs were population and area size, type of department, type of code enforcement agency, and nature of enforcement activities.

The following chart lists communities with successful and innovative code enforcement programs in the U.S. Key aspects of each program are listed on the vertical axis and communities by population size are listed on the horizontal axis.

Key Aspects

1. *Type of Department*: Whether career, volunteer, or combination. Usually refers to operational unit.
2. *Type of Model Code*: Most of the communities have adopted one of the following model codes:
   ICBO, International Conference of Building Officials
   BOCA, Building Officials and Code Administrators
   SBCC, Southern Building Code Congress
   NFPA, National Fire Protection Association
   AIA, American Insurance Association
   Other, Any code adopted from other than the above organizations
   F, Adoption of the organization's fire prevention code
   B, Adoption of the building code
3. *Code Enforcement Responsibility*: Specifies which agency enforces firesafety code. Listed as one of the following: a fire service organization including a fire department or a fire marshal's office; a consolidation of the local fire department with another local agency (i.e., building, police, or housing department or a regional consolidation of fire departments from contiguous districts); or an organization other than the fire department, such as a building department or a centralized code enforcement bureau.
4. *Code Enforcement Activities*: Mechanisms used to enforce firesafety codes in new construction and existing structures, as follows:
   - Plan Review: Routine review of all appropriate design plans for compliance with fire prevention code and life safety.
   - Sign-off on Building Permit: Official required to sign the building permit prior to issuance.
   - Sign-off on Occupancy Permit: Firesafety officials required to sign the occupancy permit prior to issuance.
   - Construction Site Inspections: Systematic, on-site inspections during construction to ensure fire code compliance.
   - Company Maintenance Inspections: Suppression personnel involvement in routine maintenance code inspections in existing buildings.
   - Fire Prevention Bureau/Uniformed: Uniformed personnel devoted solely to administering the code enforcement program, to performing specialized inspections and to securing the compliance of consistent code violators.
   - Fire Prevention Bureau/Civilian: Use of civilian personnel or personnel hired from department to perform any of the professional tasks specified in the preceding category.
   - Cross-Training: This indicates multiple use of fire fighters across traditional departmental lines. For instance, a fire fighter might also be involved in housing and building code inspections or law enforcement maintenance.
   - Rental Housing Inspection: Whether the fire department is involved in conducting fire prevention inspections in rental housing properties.
5. *Compliance Authority*: The techniques to hasten the compliance process are:
   - Company Re-Inspections: Suppression personnel are responsible for conducting follow-up inspections to check for corrections of maintenance code violations.
   - Ticket Fine: Certain inspection personnel are authorized to issue a ticket which carries a fine for code violations. The procedure is similar to the issuance of traffic tickets by police officers. The tickets can be for minor violations and the bail schedule varies according to type of violation.
   - Citation: Summons to appear in court. Some inspection personnel have certain police powers and are authorized to issue citations that require code violators to appear in court. The citation may also set a fine based on the type of violation, though only a judge can impose it.

6. *Data Information Systems*: The retrieval of building and fire incident data to assist in program planning and evaluation and the organization of inspections of existing structures.
   - Data Collection: Denotes whether the code enforcement agency collects data and contributes to either a state and/or national information system, such as, the Uniform Fire Incident Reporting System (UFIRS) or the National Fire Incident Reporting System (NFIRS).
   - Scheduling of Inspections: An "A" indicates whether a department uses an automated system to schedule and track inspections. An "M" indicates a manual system.

Additional Information

Information on the technical, administrative, political, and legal implications of code enforcement is available from the municipalities and other districts identified on the chart. Addresses are listed following the chart, with the population of each community in parentheses following the department name.

Alexandria Fire Department (150,000)
900 N. 2nd St.
Alexandria, VA 22314
(703) 750-6522

Ames Fire Department (47,000)
140 Burnett
Ames, IA 50010
(515) 232-9932

Arcade Fire District (60,000)
3000 Fulton Ave.
Sacramento, CA 95821
(916) 485-1864

Arden Fire District (60,000)
220 Park Town Circle
Sacramento, CA 95825
(916) 482-6873

Carmichael Fire District (75,000)
5634 Robertson Ave.
Carmichael, CA 95608
(916) 485-2289

Arvada Fire Protection District (148,000)
P. O. Box 3-D
Arvada, CO 80001
(303) 424-3012

Aurora Fire Department (160,000)
1470 S. Havana, Suite 424
Aurora, CO 80012
(303) 695-7116

Division of Fire Prevention (90,000)
2215 W. Old Shakopee Rd.
Bloomington, MN 55431
(612) 887-9633

Centre Region Council of Governments (72,000)
Code Enforcement
188 S. Fraser St.
State College, PA 16801
(814) 234-7195

Charlotte Fire Department (310,000)
Fire Prevention Bureau
125 S. Davidson St.
Charlotte, NC 28202
(704) 374-2101

Chicago Fire Department (3,400,000)
Bureau of Fire Prevention
121 N. La Salle St.
Chicago, IL 60602
(312) 744-4762

Cincinnati Division of Fire (413,000)
430 Central Ave.
Cincinnati, OH 45202
(503) 352-3296

Dallas Fire Department (900,000)
Fire Prevention Inspection and Education Division
201 Main St.
Dallas, TX 75201
(214) 670-4308

Department of Fire (200,000)
300 N. Main
Dayton, OH 45402
(513) 225-5344

Dover Township Fire Prevention Bureau (67,000)
55 Hyers St.
Toms River, NJ 08753
(201) 240-5153

	Group A Population: 500,000–3,500,000	Chicago, IL	Cincinnati, OH	Dallas, TX	Los Angeles, CA	Memphis, TN	Milwaukee, WI	Montgomery County, MD	Nassau County, NY	Phoenix, AZ	Prince Georges County, MD	San Jose, CA	Seattle, WA
Type of Department	Fully Paid	X	X	X	X	X	X			X		X	X
	Paid/Volunteer							X			X		
	Fully Volunteer								X				
Type of Model Code	ICBO			BF						B		BF	BF
	BOCA		BF			F		B			B		
	SBCC												
	NFPA							F			F		
	AIA								F				
	Other	BF			FB	B	BF			F			
Responsible for Code Enforcement	Fire Department	X	X	X	X	X		X	X	X	X	X	X
	Consolidation (e.g., F/B)												
	Other						X						
Code Enforcement Activities	Plan Review	X	X	X	X	X		X		X	X	X	X
	Sign-off Building Permit	X	X		X			X			X	X	X
	Sign-off Occupancy Permit	X		X	X	X		X			X	X	X
	Construction Site Inspection	X	X	X	X	X		X		X	X	X	X
	Company Maintenance Inspections	X	X	X	X			X		X	X	X	X
	FPB/Uniform Inspectors	X	X	X	X	X		X	X	X	X	X	X
	FPB/Civilian Inspectors				X					X			
	Cross-Training												
	Rental Housing Inspection	X	X								X		
Compliance Authority	Company Re-Inspection	X	X	X	X			X		X	X		X
	Ticket/Fine												
	Citation; Court Appearance	X	X	X	X	X		X	X	X	X	X	X
Data Information Systems	Data Collection	X	X	X	X	X		X		X	X	X	X
	Scheduling of Inspectors (e.g., Manual/Automated)	A	M	M	M	M		M	M	M	M	A	M

	Group B Population: 120,000–500,000	Alexandria, VA	Arvada, CO	Aurora, CO	Charlotte, NC	Dayton, OH	Guilford County, NC	Miami, FL	Oklahoma City, OK	Scottsdale, AZ	St. Paul, MN	Wichita, KS	Orlando, FL
Type of Department	Fully Paid	X		X	X	X		X	X		X	X	X
	Paid/Volunteer		X							X			
	Fully Volunteer						X						
Type of Model Code	ICBO		BF	BF						BF	BF	BF	
	BOCA	BF				BF			BF				
	SBCC												BF
	NFPA						F						
	AIA						B						
	Other				BF			BF					
Responsible for Code Enforcement	Fire Department	X	X	X	X	X	X		X	X	X	X	X
	Consolidation (e.g., F/B)							X					
	Other												
Code Enforcement Activities	Plan Review	X	X	X	X	X	X	X	X	X	X	X	X
	Sign-off Building Permit		X	X	X		X	X	X	X	X	X	
	Sign-off Occupancy Permit		X	X	X	X	X	X	X	X	X	X	X
	Construction Site Inspection	X	X	X	X			X	X	X	X		X
	Company Maintenance Inspections	X	X	X	X	X	X	X	X	X	X	X	X
	FPB/Uniform Inspectors	X	X	X	X	X	X	X	X	X	X	X	X
	FPB/Civilian Inspectors			X	X	X		X			X		X
	Cross-Training												
	Rental Housing Inspection								X				X
Compliance Authority	Company Re-Inspection	X		X	X	X	X		X		X	X	X
	Ticket/Fine					X			X		X		
	Citation; Court Appearance	X		X	X	X	X	X	X		X	X	
Data Information Systems	Data Collection	X		X	X	X	X	X	X	X	X	X	X
	Scheduling of Inspectors (e.g., Manual/Automated)	M	M	M	A	A	M	M	A	M	M	A	M

	Group C Population: 45,000–120,000	Ames, IA	Arcade, CA	Bloomington, MN	Centre Region, PA	Dover Township, NJ	Edina, MN	Farmington Hills, MI	Mountain View, CA	Mount Prospect, IL	Rancho Cordova, CA	Rock Island, IL
Type of Department	Fully Paid	X	X						X	X		X
	Paid/Volunteer						X	X			X	
	Fully Volunteer			X	X	X						
Type of Model Code	ICBO	BF	BF	B			BF		BF		BF	B
	BOCA				BF	BF		BF		BF		
	SBCC											
	NFPA			F								F
	AIA											
	Other				X							
Responsible for Code Enforcement	Fire Department	X				X		X	X	X		X
	Consolidation (e.g., F/B)		X				X				X	
	Other			X								
Code Enforcement Activities	Plan Review	X	X	X		X	X	X	X	X	X	X
	Sign-off Building Permit		X	X		X	X			X		X
	Sign-off Occupancy Permit	X	X	X		X	X		X	X		
	Construction Site Inspection	X	X	X		X	X	X	X	X		X
	Company Maintenance Inspections	X	X				X		X		X	X
	FPB/Uniform Inspectors	X		X		X	X	X	X	X	X	X
	FPB/Civilian Inspectors									X		
	Cross-Training						X			X		
	Rental Housing Inspection	X				X						
Compliance Authority	Company Re-Inspection		X				X		X		X	X
	Ticket/Fine			X							X	
	Citation; Court Appearance		X	X		X	X				X	X
Data Information Systems	Data Collection	X	X	X		X	X	X	X		X	X
	Scheduling of Inspectors (e.g., Manual/Automated)	A	M	M		A	M	M	M	M	M	M

Group D Population: 5,000–45,000

		Fairborn, OH	Fenton, MI	Kirkland, WA	Oak Brook, IL	Oak Park, MI	Palm Springs, CA	Rialto, CA	San Clemente, CA	Tracey, CA	Willows, CA
Type of Department	Fully Paid				X		X	X			
	Paid/Volunteer	X	X	X		X			X	X	X
	Fully Volunteer										
Type of Model Code	ICBO			BF			BF	BF	BF	BF	BF
	BOCA	BF	BF			BF					
	SBCC										
	NFPA										
	AIA				F						
	Other				B						
Responsible for Code Enforcement	Fire Department	X	X				X		X		
	Consolidation (e.g., F/B)			X	X	X		X		X	X
	Other										
Code Enforcement Activities	Plan Review	X	X	X	X	X	X	X	X	X	X
	Sign-off Building Permit	X	X	X	X	X			X	X	X
	Sign-off Occupancy Permit		X	X	X	X			X	X	X
	Construction Site Inspection		X	X	X	X	X	X	X	X	X
	Company Maintenance Inspections	X		X		X	X	X	X	X	X
	FPB/Uniform Inspectors	X	X	X	X	X	X	X	X	X	X
	FPB/Civilian Inspectors		X	X						X	
	Cross-Training	X			X	X		X		X	X
	Rental Housing Inspection		X					X			
Compliance Authority	Company Re-Inspection	X	X	X			X	X	X	X	X
	Ticket/Fine						X				
	Citation; Court Appearance	X	X				X		X	X	X
Data Information Systems	Data Collection	X	X	X		X	X	X	X	X	X
	Scheduling of Inspectors (e.g., Manual/Automated)	M	M	M	M	M	M	M	M	M	M

Edina Fire Department (49,000)
6250 Tracy Ave.
Edina, MN 55436

Fairborn Fire Department (36,000)
70 W. Hebble Ave.
Fairborn, OH 45324
(513) 879-1730

Farmington Hills Fire Department (60,000)
28711 Drake Rd.
Farmington Hills, MI 40808
(313) 553-0740

Fenton Fire Department (9,000)
301 S. Leroy St.
Fenton, MI 48430
(313) 629-5349

Department of Emergency Services
(350,000)
Guilford County Fire Marshal
P. O. Box 11356
Greensboro, NC 27409
(919) 299-1351

Kirkland Department of Fire Services
(12,000 - Kirkland)
(33,000 - King County Fire District #41)
210 Main St.
Kirkland, WA 98033
(206) 827-4606

Los Angeles Fire Department (3,000,000)
Fire Prevention Bureau
Engineering and Research Section
200 Main St.
Los Angeles, CA 90012
(213) 485-5980

Memphis Fire Department (700,000)
Memphis, TN
(901) 458-8281

City of Miami Fire Department (380,000)
P. O. Box 330708
Miami, FL 33133
(305) 350-7800

Milwaukee Fire Department (670,000)
6680 N. Teutonia Ave.
Milwaukee, WI 53209
(414) 347-2323

Department of Building Inspection
(141) 278-2548

Division of Fire Prevention (550,000)
Department of Fire/Rescue Services
Montgomery County Government
6110 Executive Blvd.
Rockville, MD 20851
(301) 468-4153

Mount Prospect Fire Department (55,000)
112 E. Northwest Highway
Mount Prospect, IL 60056
(312) 392-6000, Ext. 165

Mountain View Fire Department (60,000)
997 Villa St.
Mountain View, CA 84041
(415) 966-6365

Nassau County Fire Marshal (1,000,000)
899 Jerusalem
Uniondale, NY 11553
(516) 292-4850

Office of the City Manager (6,000
Residential) (30,000 Commercial)
Department of Fire
Oak Brook, IL 60521
(312) 654-2220

Oak Park Public Safety (36,700)
Fire Division
13600 Oak Park Blvd.
Oak Park, MI 48237
(313) 547-1337, Ext. 283

Oklahoma City Fire Department (390,000)
820 Northwest 5
Oklahoma City, OK 73106
(405) 235-3314

Orlando Fire Department (124,000)
P.O. Box 2846
Orlando, FL 32802
(305) 849-2386

Palm Springs Fire Department (35,000)
(90,000 during tourist season)
3000 N. El Cielo Rd.
Palm Springs, CA 92262

Phoenix Fire Department (850,000)
620 W. Washington
Phoenix, AZ 85003
(602) 262-6297

Prince Georges County Fire Department
(670,000)
4318 Rhode Island Ave.
Brentwood, MD 20722
(301) 699-2942

Rancho Cordova Dire District (114,000)
10595 Fulsom Blvd.
Rancho Cordova, CA 95670
(916) 363-9463

Rialto Fire Department (31,000)
108 E. Rialto Ave.
Rialto, CA 92376
(714) 375-3410

Rock Island Fire Department (47,000)
1313 - 5th Ave.
Rock Island, IL 61201
(309) 793-3475

San Clemente Fire Department (30,000)
100 Avenida Presidio
San Clemente, CA 92672
(714) 492-5101

San Jose Fire Department (672,000)
476 Park Ave.
San Jose, CA
277-4656

St. Paul Fire Department (280,000)
101 E. 10th St.
St. Paul, MN 55101
(612) 224-7811)

Rural Metro Fire Department (100,000)
P. O. Box F
Scottsdale, AR 85252
(602) 994-3886

Seattle Fire Department (550,000)
301 2nd Ave., NW
Seattle, WA 98104
(206) 625-4077

Tracy Fire Department (17,000)
Tracy, CA 95376
(209) 835-2525

Wichita Fire Department (280,000)
455 N. Main
Wichita, KS 67202
(316) 268-4451

Willows Fire Department (5,000)
445 S. Butte
Willows, CA 95988
(916) 934-3323

Code Administration Resource Directory Project Team Members

IAFC Executive Committee

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President
Tulsa, OK

Chief Charles Kamprad
First Vice President
St. Louis, MO

Chief Douglas Pollington
Second Vice President
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Immediate Past President
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Innovative Techniques in Building Code Enforcement

Cities throughout the country have been experimenting with a variety of new techniques to increase the effectiveness of building code enforcement. This technology has recently been disseminated and transferred to other communities. Listed here are references for information about experiments that have been successful in expanding the depth, coverage, and reliability of inspections and/or that have expedited compliance of code violations.

Administrative Improvements

Computerized Scheduling of Inspections

Ames Fire Department
1300 Burnet
Ames, IA 50010
(515) 232-9932

Charlotte Fire Department
125 S. Davidson
Charlotte, NC 28202
(704) 374-2102

Chicago Fire Department
Bureau of Fire Prevention
121 N. LaSalle
Chicago, IL 60602
(312) 744-4759

Dayton Fire Department
300 N. Main
Dayton, OH 45402
(513) 225-5344

Dover Township Fire Department
55 Hyers St.
Toms River, NJ 08753
(201) 240-5153

Oklahoma City Fire Department
820 Northwest 5
Oklahoma City, OK 73106
(405) 235-3314

San Jose Fire Department
476 Park Ave.
San Jose, CA 95110
(408) 277-4656

Santa Ana Fire Department
120 W. Wright St.
Santa Ana, CA 92701
(714) 834-4125

Wichita Fire Department
455 N. Main
Wichita, KS 67202
(316) 268-4451

FIRS

The National Fire Protection Association offers a software package for computerized scheduling of inspections that is designed for the collection, storage, and processing of inspection data and the scheduling of inspections. The Fire Inspection Reporting System (FIRS) package includes eight volumes of documentation, computer programs, test data, and six days of on-site technical assistance in implementation of the system. For further information contact:

Manager, Fire Service Management Systems
National Fire Protection Association
Batterymarch Park
Quincy, MA 02269
(617) 328-9290

UFIRS

A software package for the collection and analysis of fire incident data has also been developed. The Uniform Fire Incident Reporting System (UFIRS) is currently assisting communities in documenting, storing, and analyzing fire incident data. Communities that are currently using UFIRS are listed as follows.

UFRIS Communities

Arizona
Tucson Fire Department
P.O. Box 27210
Tucson

California
Anaheim Fire Department
500 E. Broadway
Anaheim

Berkeley Fire Department
2105 Grove St.
Berkeley

Fresno Fire Department
450 M St.
Fresno

Mountain View Fire Department
997 Villa St.
Mountain View

Oakland Fire Department
1330 Grove St.
Oakland

Palo Alto Fire Department
250 Hamilton Ave.
Palo Alto

Sacramento Fire Department
915 Eye St., Room 3
Sacramento

San Jose Fire Department
476 Park Ave.
San Jose

Santa Barbara County Fire Department
4410 Cathedral Oaks Rd.
Santa Barbara

Torrance Fire Department
1701 Crenshaw Blvd.
Torrance
Colorado
Denver Fire Department
745 W. Colfax Ave.
Denver
Florida
Jacksonville Fire Division
1350 E. Adams St.
Jacksonville

Illinois
Rockford Fire Department
204 S. First St.
Rockford
Kansas
Wichita Fire Department
455 N. Main
12th Floor
Wichita
Louisiana
Fire Department Headquarters
317 Decatur St.
New Orleans
Maryland
Anne Arundel County Fire Department
P.O. Box 276
Millersville

Baltimore County Fire Department
800 York Rd.
Towson
Michigan
Lansing Fire Department
120 E. Shiawassee
Lansing
Missouri
Columbia Fire Department
P.O. Box N
Columbia

Kansas City Fire Department
22nd Floor, City Hall
414 E. 12th St.
Kansas City
Nebraska
Lincoln Fire Department
1801 Q St.
Lincoln
New Jersey
Elizabeth Fire Department
316 Irving Ave.
Elizabeth
New Mexico
Albuquerque Fire Department
P.O. Box 258
Albuquerque

New York
Syracuse Department of Fire
Room 602
Public Safety Building
511 S. State St.
Syracuse

North Carolina
Greensboro Fire Department
318 N. Greene St.
Greensboro

Oklahoma
Tulsa Fire Department
411 S. Frankfort St.
Tulsa

Pennsylvania
Pittsburgh Fire Department
Sixth Floor, Public Safety Bldg.
Pittsburgh

Texas
Dallas Fire Department
2111 Main St.
Dallas

Fort Worth Fire Department
1000 Throckmorton St.
Fort Worth

Houston Fire Department
410 Bagby
Houston

San Antonio Fire Department
P.O. Box 9066
San Antonio

Virginia
Chesterfield County Fire Department
P.O. Box 40
Chesterfield

Portsmouth Fire Department
361 Effingham St.
Portsmouth

Washington
Bellevue Fire Department
P.O. Box 1768
Bellevue

Everett Fire Department
2801 Oakes
Everett

Wisconsin
Madison Fire Department
City of Madison
Madison

Canada
Kitchener Fire Department
150 Highland Rd., W
Kitchener, Ont.

Saskatoon Fire Department
125 Idylwyld Dr., S
Saskatoon, SK

NFIRS

Below are listed states which are currently using the data collection system that is maintained by the Federal Emergency Management Agency, commonly known as NFIRS.

Alaska
Arizona
Arkansas
California
*Colorado
Connecticut
Delaware
District of Columbia
Florida
Georgia
Hawaii
Idaho
Illinois
Iowa
Kansas
Louisiana
Maine
Maryland
Massachusetts
Michigan
Minnesota
Montana
Nevada
New Hampshire
New Jersey
*New Mexico
New York
North Carolina
Ohio
Oregon
Rhode Island
South Carolina
South Dakota
Tennessee
Texas
*Vermont
Washington
West Virginia
Wisconsin
Wyoming

Judicial Procedures

Administrative Hearing Boards

Code Compliance Board:
Chicago Fire Department
Bureau of Fire Prevention
121 N. LaSalle St.
Chicago, IL 60602
(312) 744-4762

Code Enforcement Board:
Law Department
City of Orlando
Orlando, FL 32802

Local Board of Inspections and Appeals:
Department of Fire
300 N. Main
Dayton, OH 45402
(513) 225-5344

Palm Beach County Code Enforcement Board:
Planning, Zoning and Building Department
810 Datura St.
West Palm Beach, FL 33402
(305) 837-3390

Special Courts for Code Compliance
City of Boston Division
1003 New Courthouse
Pemberton Square
Boston, MA 02108
(617) 725-8484

Buffalo Housing Court
Suite 350
50 Delaware Ave.
Buffalo, NY 14202
(716) 847-8200

Housing Court
Fire Municipal District
1111 Daley Center
Chicago, IL 60602
(312) 443-4528

Hampden County Division
50 State St.
Springfield, MA 01103
(413) 781-8100

Housing Session
Superior Court
Hartford/New Britain Judicial District
83½ Lafayette St.
Hartford, CT 06106
(203) 566-8550

Enforcement Court
Municipal Court of Marion County
1442 City-County Bldg.
Indianapolis, IN 64204
(317) 633-8224

Pittsburgh Magistrates Court
First and Grant Sts.
Pittsburgh, PA 15219
(412) 255-2605

Pre-Settlement Hearing
Seattle Municipal Court
610 Third Ave., Room 100
Seattle, WA 98104
(206) 625-4741

State Smoke Detector Requirements

Over 50 percent of American homes are protected by smoke detectors according to a telephone survey of smoke detector requirements conducted in 1981 and published in 1982 by the Model Interstate Scientific and Technical Information Clearinghouse of the National Conference of State Legislatures. Partial funding for the survey, which also surveyed smoke detector legislation introduced in the 1981 legislative session, was received from the United States Fire Administration. The survey found that 25 states require smoke detectors in all classes of new residential construction: Alabama, Alaska, California, Colorado, Connecticut, Hawaii, Indiana, Maine, Maryland, Massachusetts, Minnesota, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, North Carolina, Oregon, Rhode Island, South Carolina, Virginia, Washington, Wisconsin, and Wyoming.

Eighteen states require one or more classes of existing residential housing to be retrofitted. Most states prescribe conditions that trigger a retrofit requirement: Alabama, Alaska (at the time of sale), Hawaii (when remodeling costs exceed $1,000), Kentucky (apartment buildings), Maryland, Massachusetts (at the time of sale), Minnesota, Nebraska (when an owner-occupied single-family house is remodeled; immediately for all rentals), Nevada (excludes single-family houses), New Jersey, (excludes single-family houses), New Mexico (when costs of remodeling exceed $1,000), North Dakota (apartment buildings), Ohio (excludes single family houses), Oregon (single-family houses when remodeling costs exceed $1,000; all others must retrofit now), South Carolina, Texas (all rentals), Washington (excludes owner-occupied single-family houses), and Wyoming (when costs of remodeling exceed $1,000 or when one or more sleeping rooms are added).

Two states require special detectors for the deaf and hearing impaired: North Dakota and Maryland.

Although it is commendable that over 50 percent of American homes are protected by smoke detectors, the report noted that smoke detector owners tend to be white, with some college education and fairly high incomes, and tend to live in higher priced housing than those not owning smoke detectors. The poor, the elderly, and minorities tend not to perceive a danger to their lives and property from fire. Thus they are less likely to purchase their own smoke detectors. In addition, the handicapped have not been reached by most state smoke detector requirements. In conclusion, the report stated that additional requirements for smoke detectors should extend fire protection to almost every American, with specific requirements for detectors for the deaf and hearing impaired and for existing housing — especially that occupied by the poor and the elderly.

The results of the survey for each state are included as follows.

Alabama

Current Status

Smoke detectors are required in all new and existing residential buildings. This requirement is applicable to single-family dwellings as well as multi-unit dwellings. During the 1981 legislative session, a law was passed to require a smoke detector in each hotel guest sleeping room. This law is applicable to new and existing buildings. Smoke detectors are also required in all hospitals which are not already equipped with automatic sprinkler systems, all correctional institutions, and all child day-care centers. Battery-operated smoke detectors are permitted in existing structures, but smoke detectors in new structures must be wired into the main power source.

Survey Shows Smoke Detector Legislation Is Sweeping the Country

According to a recent survey of 164 fire chiefs in 43 states and 121 cities, there is a trend toward compulsory smoke detector installation in new single-family, hotel and motel, and apartment buildings. The survey was conducted by BRK Electronics, a division of Pittway Corporation.

More than 47 percent of the 164 chiefs indicated that their city or state either had strengthened smoke detector regulations during the past two years or planned to do so.

All but 7 percent reported that their city or state had a law governing new construction.

More than 65 percent of the respondents indicated that smoke detectors also were required in some forms of existing construction — primarily in hotels, motels, and apartments.

Finally, nearly 60 percent of the chiefs polled, including those in Los Angeles, Hartford, Baltimore, and Kansas City, Missouri, indicated that smoke detectors were mandatory in existing single-family dwellings as well as in newly constructed homes.

(From *Fire Service Today*, November 1982, p. 5)

Codes

Alabama has adopted the 1976 edition of the Standard Building Code and the Standard Fire Code which are mandatory throughout the state. For institutional buildings, the 1976 Edition of NFPA *101* is enforced. Local ordinances are permitted but must not be in conflict with state ordinances.

1981 Bill Introductions

Two bills were introduced in the 1981 legislative session. S.29 and H.40 would require hotel owners to install and maintain smoke detectors in each hotel guest sleeping room. S.29 would also include provisions for maintenance of detectors and established penalities for tampering with or removing a smoke detector from a room. S.20 passed into law as Act 290. H.40 died.

Contact

Roy Thornell
State Fire Marshal
445 S. McDonaugh St.
Montgomery, AL 36104

Alaska

Current Status

Alaska requires smoke detection devices in all living units built, manufactured, or sold in the state. This law is interpreted to include all existing buildings. Smoke detection devices must comply with NFPA 74. In addition to single-station smoke detectors for each dwelling unit, supervised smoke detection systems are required in hospitals, nursing homes, homes for children, jails, prisons, apartment buildings, and hotels.

Codes

For fire prevention, Alaska has adopted, with amendments, the 1979 editions of the Uniform Building Code, the Uniform Fire Code, and the Uniform Mechanical Code.

The state fire marshal's office is part of the Department of Public Safety. The department has adopted rules and regulations relating to fire detection and suppression equipment as well as safety criteria for commercial, industrial, business, institutional and other public buildings, and buildings used for residential purposes (4 or more dwelling units).

1981 Bill Introductions

None. However, a study on the use of smoke detectors in rural Alaskan residences was prepared for the Alaska Council on Science and Technology which is administering a research program on this subject.

Contact

Ronald Hendrie
State Fire Marshal
Department of Public Safety
533 Fairbanks St., Suite 11
Anchorage, AK 99502

Arizona

Current Status

Arizona has no smoke detector legislation applicable to residential housing. Schools and health care institutions are required to have smoke detection systems. Legislation to require smoke detectors was passed in the Senate during the 1981 session, but failed in the House.

Codes

The Arizona state fire marshal's office enforces a minimum standard state code based on the 1979 edition of the Uniform Fire Code. The 1981 edition of the NFPA *101* has also been adopted. Fire codes applicable to residential buildings are left to the jurisdiction.

1981 Bill Introductions

SB.1371 would have prescribed requirements for the installation and location of smoke detectors in new residential buildings. Smoke detectors would have been required in all residential housing before completion of construction. The fire marshal would have proposed standards governing smoke detectors which would have been submitted to the Industrial Commission for approval. The proposed ordinance would not supercede ordinances by municipalities, counties or localities or the fire code of any fire district. The bill died in committee.

HB.2190, would have excluded the price paid for smoke or fire alarm systems and other fire prevention devices from tax assessment in certain classes of properties. The bill died in committee.

Arkansas

Current Status

Arkansas has no legislation applicable to residential housing. Legislation was passed to require smoke detectors in nursing homes.

Codes

Arkansas enforces the 1965 Arkansas State Fire Prevention and Building Code which has no provisions for smoke detectors. The state fire marshal's office is working with the Arkansas Department of Labor, the Arkansas state OSHA office, and other interested parties to revise the 1965 code which will include provisions to require smoke detectors in occupancies of more than 15 persons — triplexes and apartment buildings. (Under Arkansas law, a building must house more than 15 persons to be under the jurisdiction of the fire code. However, new residences built by contractors for resale will have to comply with the code.) Existing structures undergoing remodeling efforts totaling 50 percent or more of the value of the building will also have to be brought into compliance.

Arkansas law requires legislative approval before a revised code can be adopted. The revised code is expected to be presented to the legislature in January, 1983.

Bill Introductions

HB.954, which passed into law (Act 570, 1981), amends Section 1 and 2 of Act 374, 1979. Act 374 required licensed nursing homes to install and maintain either a sprinkler system or a particle sensor devise system with visual signals outside each room by June 30, 1981. Act 570 repealed the June 30, 1981 deadline. Nursing homes that had not yet begun installation of an approved system at the time of passage were required to begin installation immediately.

Contact

Ray E. Carnahan
State Police
Fire Marshal Section
P.O. Box 4005
Little Rock, AR 72214
(501) 371-1846

California

Current Status

All new dwelling units are required to have smoke detection devices. Requirements for existing housing are handled on a local basis.

Codes

California enforces the State Housing Law which references the 1976 edition of the Uniform Building Code. The law includes jurisdiction over 1- and 2-family dwellings and apartment buildings.

1981 Bill Introductions

AB.683 would authorize a credit of an amount equal to 25 percent of cost of a fire protection system installed in a dwelling owned by the taxpayer. The state fire marshal would adopt regulations which would establish minimum standards for systems. Pending.

Contact

Philip Favro
State Fire Marshal
7171 Bowling Dr., Suite 800
Sacramento, CA 95823

Colorado

Current Status

Smoke detectors are required in all new residential, multifamily and manufactured construction, hospitals, nursing homes and other residential care facilities.

Requirements for smoke detectors in existing buildings is left to local jursidictions.

Codes

Colorado has no statewide fire code. The state enforces the 1979 edition of the Uniform Building Code, a mandatory minimum standard code. Local jurisdictions may adopt more stringent standards. Currently, the administrative process of adopting the 1979 edition of the UBS is almost completed.

For hospitals and other public institutions, a combination of the 1976 and 1973 editions of NFPA *101* are used.

1981 Bill Introductions

HB.1282, which would have given countries the authority to establish fire codes, died in committee.

Contact

Art Cucher
Division of Housing
Denver, CO 80203
(303) 866-2033

Bernie Nash
Fire Marshal
Aurora, CO
(303) 695-7110

Connecticut

Current Status

New single-family dwellings and multifamily residential buildings must be equipped with smoke detectors. Hospitals and convalescent homes not equipped with sprinkler systems must be equipped with smoke detectors.

Codes

The fire safety code, which is administered by the state fire marshal's office, has no jurisdiction over single-family dwellings. The requirements for single-family dwellings are found in the general statutes.

1981 Bill Introductions

HB.6882 would have given the state Fire Safety Code Standards committee the authority to prepare a fire safety code and would have required the use of national standards when preparing the code. According to a bill analysis by the Connecticut Office of Legislative Research, specific reference to smoke detection devices in residential buildings would be eliminated under this bill, which died in committee.

Contact

Captain Lesley Williams
Deputy State Fire Marshal
294 Colony St.
Meriden, CT 06450

Delaware

Current Status

Delaware has no statewide smoke detector legislation applicable to residential buildings.

Codes

The state fire marshal's office enforces the "Fire Prevention Rules and Regulations for the State of Delaware." It is based on the 1973 NFPA's Fire Prevention Code. There is no state building code.

1981 Bill Introductions

SB.97, which would have required any new, extensively altered, or renovated residential building or mobile home to be equipped with smoke detectors, did not pass.

Contact

J. Benjamin Roy, Jr.
State Fire Marshal
P.O. Box 109
Dover, DE 19901
(302) 736-4393

Florida

Current Status

Florida has no smoke detector legislation applicable to residential buildings.

Codes

Florida has no fire code, but there is the Florida Safety Board which makes rules and regulations.

Florida enforces the mandatory State Minimum Building Code which is based on the 1976 edition of the Southern Building Code, the National Building Code, and the 1- and 2-Family Dwelling Code. The portions of the codes requiring smoke detectors in residences were not adopted.

1981 Bill Introductions

None

Contact

Dennis Dewar
State Fire Marshal's Office
Gaines St., Larson Bldg.
Room 4254
Tallahassee, FL 32304

Georgia

Current Status

Georgia has no smoke detection applicable to residential housing. Smoke detectors are required in motels, hospitals, and nursing homes in a manner prescribed by the 1976 edition of NFPA *101*.

Codes

The state fire marshal's office enforces the 1976 edition of the NFPA *101* which is part of the 1949 Georgia Safety Fire Act, as amended in 1968.

1981 Bill Introductions

HB.9, which would require smoke detectors in apartment buildings, was still in Committee when the legislature adjourned.

Contact

Bob R. Gore, Jr.
State Fire Marshal
State Capitol
Atlanta, GA 30334
(404) 656-2064

Hawaii

Current Status

There is no smoke detector legislation at the state level in Hawaii because the state no longer promulgates codes. However, each county and island requires smoke detectors in nursing homes, hotels, motels, and new residential construction. Each also requires existing buildings to be equipped with smoke detectors when renovation costs exceed $1,000.

Codes

Each county and island in Hawaii has adopted the 1978/79 edition of the Uniform Fire Code.

1981 Bill Introductions

None

Contact

Melvin Nonaka, Fire Chief
Fire Department
S. Beretania St.
Honolulu, HI 96814

Illinois

Current Status

Illinois has no statewide smoke detector legislation for residential buildings. Automatic smoke detection systems are required for nursing homes, hospitals, and other institutional buildings. Hotels with more than 2 stories or an occupancy of more than 20 persons are required to install smoke detectors which must plug into an electrical outlet and which must contain a stand-by battery. Smoke detection systems are required in the sleeping rooms and the halls of all institutional buildings.

Code

Illinois developed and enforces its own code, "Illinois Rules and Regulations for Fire Prevention and Safety."

1981 Bill Introductions

None

Contact

Jack Henry Carter, Sr.
State Fire Marshal
Division of Fire Prevention
3150 Executive Park Dr.
Springfield, IL 62706
(317) 232-2222

Indiana

Current Status

Indiana requires smoke detectors in all new homes, mobile homes, boarding houses, hotels and motels.

Codes

Indiana has adopted the 1979 edition of the Uniform Building Code. A municipality may adopt codes other than these adopted by the state as long as the provisions are not in conflict with the state code.

1981 Bill Introductions

S.349 would have created a "hotel and motel fire safety advisory study committee" to study fire safety devices and systems and tax incentives to promote compliances. It passed the Senate and was referred to the House where it died in committee.

SCR.3 would have directed the State Fire Prevention Commission to draft a fire prevention code for the state by July 1, 1983. The bill died in committee.

Iowa

Current Status

There are no statewide mandatory requirements for smoke detectors in non-commercial residential buildings.

Codes

Iowa has a state building code and has also adopted NFPA *101*. The state building code requires smoke detectors in new buildings; but it is not mandatory for cities and localities to adopt the code.

1981 Bill Introductions

S.324, which would require a smoke detector in each sleeping room and corridor of hotels, motels, dormitories, apartments and other residential buildings, has passed and was signed by the governor.

H.467, which would authorize the state fire marshal to promulgate fire safety rules and includes a provision to make non-compliance with the provisions of the law a misdemeanor, was passed and signed by the governor.

Contact

Wilbur R. Johnson
State Fire Marshal
State Office Building
523 E. 12th St.
Des Moines, IA 50319
(515) 281-5821

Kansas

Current Status

Kansas has no statewide requirements for smoke detectors in residential buildings.

Codes

Kansas has adopted portions of the 1976 edition of NFPA *101*. Most localities have adopted parts of the Uniform Building Code. There is no statewide building code.

1981 Bill Introductions

None

Contact

Edward C. Redmon
State Fire Marshal
Mills Bldg.
109 W. 9th St.
Topeka, KS 66612
(913) 296-3401

Kentucky

Current Status

There are no statewide mandatory requirements for smoke detectors in single-family residential dwellings. New hotels and motels must be equipped with smoke detectors; existing hotels and motels are exempt. New and existing apartment buildings and duplexes are required to have smoke detectors. In all new construction, smoke detectors must be hard wired into the electrical system. In existing construction, smoke detectors must be powered from the main power source, i.e., an electrical outlet.

Codes

The state has adopted the Kentucky Building Code based on the BOCA code. Within 6 months, the state fire marshal's office expects to adopt the 1981 edition. The building code is mandatory in Kentucky for all construction except single-family homes. The state fire marshal's office also enforces the 1979 edition of NFPA *101* for hospitals and other institutional care facilities. The office estimated that 75 percent of the population lives in areas which have adopted the single-family portion of the Code.

1981 Bill Introductions

None

Contact

Gayle S. Horn
State Fire Marshal
L/S 127 Office Building, S
Frankfort, KY 40601
(502) 564-3626

Louisiana

Current Status

Louisiana has no statewide requirements for smoke detectors in residential buildings. Hospitals and other institutional care facilities must be equipped with smoke detectors.

Codes

Louisiana enforces the 1973 edition of the *Life Safety Code* (NFPA *101*). The House introduced legislation to adopt the 1979/80 edition of the Standard Building Code and the Standard Fire Prevention Code, but the bill died in committee.

1981 Bill Introductions

HB.710 would have imposed the Southern Building Code Congress' Standard Building Code of 1979 with 1980 revisions and its companion document the Standard Fire Prevention Code of 1979 with 1980 revisions as standards for construction of structures and movables. This bill died in House Committee.

Contact

Daniel L. Kelley
State Fire Marshal
State Office Building
325 Loyola St.
Room 106
New Orleans, LA 70112
(504) 568-5500

Maine

Current Status

Legislation passed this session requires smoke detectors in new single-family dwellings and new existing multi-unit apartment buildings. Efffective July 1, 1981, all hotels with more than 15 sleeping rooms for hire and taller than two stories must be equipped with smoke detectors. Hospitals, nursing homes, and day-care facilities must also be equipped with smoke detectors under the *Life Safety Code* (NFPA *101*).

Codes

Maine enforces the 1976 edition, NFPA *101* for certain occupancies.

1981 Bill Introductions

Public Law Chapter 399, which requires smoke detectors in all multi-unit apartment dwellings and new single-family residences, went into effect September 18, 1981.

Contact

Don Bisset
State Fire Marshal
Department of Public Safety
99 Western Ave.
Augusta, ME 04333
(207) 289-2481

Maryland

Current Status

HB.1063, which amended Article 38A, Section 12A, passed into law in 1981. Each sleeping area in all residential occupancies must have at least one approved smoke detector.

The Maryland law includes a special provision for the deaf or hearing impaired. Upon written request by a deaf or hearing-impaired person to the landlord, a special type of smoke detector, which provides a light signal upon activation, must be provided. The landlord may require a refundable deposit (which may not exceed the cost of the detector) and the tenant must be responsible for maintenance of the smoke detector. Hotels and motels must have at least one such smoke detector for each 50 units or less. (A deposit may be required under the condition described above).

The occupant of a 1-, 2-, or 3-dwelling residential structure constructed prior to July 1, 1965 must equip the dwelling with a smoke detector by July 1, 1982.

Smoke detectors sensing either visible or invisible particles of combustion are allowed. Each detector must be operated on an AC primary source of electric power, except those installed in residences constructed prior to July 1, 1965. Those residences may use a battery-powered device.

After investigating a fire, the state fire marshal or the local investigating unit must issue a smoke detector installation order if there are no smoke detectors in the occupancy. Installation must be completed within 15 days.

Codes

The Fire Prevention Commission has the authority to amend, promulgate, and repeal the regulations of the State Fire Prevention Code. The state fire marshal is authorized to enforce the code.

1981 Bill Introductions

HB.1063 described above passed into law.

Contact

State Fire Marshal
301 W. Preston St.
Baltimore, MD 21201
(301) 383-2520

Massachusetts

Current Status

Every building or structure not exceeding seventy feet in height erected or altered for residential purposes must be protected with an automatic fire warning system which must feature an automatic smoke detection system. This provision applies only to buildings constructed or altered after January 1, 1975.

One smoke detector must be installed on the ceiling of each stairway leading to the floor above and one smoke detector must be installed outside each separate sleeping area if there are no more than 2 dwelling units. For a building with more than 2 dwelling units, smoke detectors must also be placed in all common hallways of a structure.

Effective January 1, 1982, all buildings used for residential purposes must be equipped with smoke detectors by the owner at the time of sale or transfer.

Code

Massachusetts enforces the Massachusetts State Building Code. The Board of Fire Prevention Regulation has the responsibility of formulating and promulgating regulations.

1981 Bill Introductions

None

Contact

Joseph O'Keefe
State Fire Marshal
Department of State Police
1010 Commonwealth Ave.
Boston, MA 02215
(617) 566-4500

Michigan

Current Status

Michigan has no statewide requirements for smoke detectors in residences. Through various codes governing specific occupancies, Michigan does require smoke detectors in child care centers, hospitals, nursing homes, adult foster care facilities, children's camps, and schools.

Codes

Michigan enforces the 1978 edition of the Basic Building Code. The state also enforces the Fire Prevention Act of 1981.

1981 Bill Introductions

SB.263 would require automatic smoke detection systems in new residential buildings built or used in the state. The bill died in committee.

Contact

William Rucinski, Captain
Department of Public Safety
Chief Fire Marshal Division
7150 Harris Dr.
Lansing, MI 48913
(517) 322-1924

Minnesota

Current Status

Smoke detectors are required in all new and existing residential occupancies, including rental residential, hotels, apartments buildings, and college dorms. The responsibility for maintaining smoke detectors in rentals is given to owners and managers.

There is a provision that requires smoke detectors in new construction to be wired into the electrical system. Rules have been promulgated specifying placement of smoke detectors.

Codes

Minnesota enforces the Minnesota Building Code. Local ordinances may not supercede any state ordinance.

1981 Bill Introduction

None

Contact

Wes Werner
State Fire Marshal
1246 University Ave.
St. Paul, MN 55104
(612) 296-7641

Mississippi

Current Status

Mississippi requires smoke detectors in new commercial residential buildings which include apartment buildings, hotels, and motels. There are no requirements for 1- and 2-family dwellings.

Codes

The Mississippi Fire Prevention Code was adopted in July, 1978. Local jurisdictions are required to adopt the Code but may include local ordinances which are more stringent than the state fire code. The code has no provisions for 1- and 2-family dwellings.

1981 Bill Introduction

None

Contact

John Chamblee
Department of State Fire Marshal
P.O. Box 22542
Jackson, MS 39205
(601) 354-6304

Missouri

Current Status

Missouri has no statewide requirements for smoke detectors in residences. Smoke detectors are required in child day-care facilities, day-care homes, nursing homes, and hospitals. These systems must be wired into the electrical system.

Code

There is no statewide fire code.

1981 Bill Introductions

HB.593 would have required all hotels, motels and other establishments providing lodging to transient guests to be equipped with an automatic fire detection and alarm system. In addition, each room within such hotel, motel, or establishment would have had to be equipped with an automatic smoke detector. The bill died after a committee report.

Contact

James J. Helbig
State Fire Marshal
Department of Public Safety
621 E. Capitol
Box 844
Jefferson City, MD 65102

Montana

Current Status

Montana requires smoke detector devices in new residential construction and in new and existing motels and hotels with at least 15 sleeping rooms.

Codes

Montana enforces the 1979 Uniform Building Code and the 1979 Uniform Fire Code.

1981 Bill Introductions

None

Contact

Robert Kelly
Chief, Fire Marshal Bureau
1409 Helena Ave.
Helena, MT 59620
(406) 449-2050

Nebraska

Current Status

A smoke detector bill, LB.296, was passed this session. Smoke detectors will be required in dwellings, apartment buildings, hotels, lodging houses, dormitories and mobile homes (certain mobile homes and manufactured housing units are exempt). Every dwelling unit and guest room built or remodeled on or after January 1, 1982 must be provided with one or more operating smoke detectors. Every guest room and dormitory constructed prior to January 1, 1982 must be provided with one or more operating smoke detectors on or before January 1, 1984. Dwelling units within a dwelling or apartment house constructed after January 1, 1982, must be provided with one or more smoke detectors at the time of sale or remodeling. Owners of rental dwelling units are responsible for supplying, installing, maintaining, and testing the smoke detectors. Occupants are responsible for replacement of the battery or the unit if the unit was operable when the occupant moved into the dwelling. LB.296A, which also passed this session, appropriates 40,000 to the state fire marshal to aid in carrying out the provisions of LB.296.

Codes

Nebraska has adopted the 1973 edition of NFPA *101* which is not mandatory statewide. With regards to the new law, political subdivisions in Nebraska may not adopt less stringent standards.

1981 Bill Introductions

LB.296, described above, is now law.

LB.296A, described above, is now law.

Contact

Wally Bardett
State Fire Marshal
301 Centennial Mall, S
Lincoln, NE 68508

Nevada

Current Status

Nevada requires smoke detectors in newly constructed residences, new sleeping quarters of apartments and hotels, and in public buildings. Legislation passed during the 1981 legislative session requires that existing hotels, motels, and apartment buildings have smoke detectors in each sleeping room.

Code

Nevada enforces the 1976 edition of the Uniform Building Code and the 1973 edition of NFPA *101*. The state fire marshal's office has adopted the 1973 edition of the *National Fire Code*, where necessary to supplement the UBC. Application is statewide.

1981 Bill Introductions

SB.214, which would require operators and owners of existing hotels and motels with at least 6 rooms and apartment buildings with at least 3 dwelling units to equip each room with an approved smoke detector, passed.

Contact

Tom J. Huddleston
State Fire Marshal
Capitol Complex
Carson City, NV 39710
(702) 885-5911

New Mexico

Current Status

New Mexico requires smoke detectors in all residential construction, including hotels and motels. Existing residences must comply with the code when additions exceeding $1,000 are made. Compliance is required of existing buildings if certain alterations are made. In new construction, smoke detectors must be hard wired into the electrical system. One detector must be installed in each sleeping room. Public occupancies such as schools, hospitals, office buildings, and nursing homes are required to comply with the smoke detector requirements in NFPA *101*.

Codes

New Mexico has adopted the 1979 edition of the Uniform Building Code, which is administered through the Construction Industries Division. Local jurisdictions are required to enforce this code but may adopt more stringent provisions. The 1979 edition of NFPA *101* was adopted through the authority of the state fire marshal's office.

981 Bill Introductions

None

Contact

Manual Garcia
Superintendent of Insurance
State of New Mexico
Fire Marshal's Office
P.O. Box 1269
Santa Fe, NM 87501
(505) 827-2357

New Hampshire

Current Status

Prior to the 1981 legislative session, New Hampshire required only new residential buildings of 70 feet or more in height to have smoke detection systems. A law passed this session requires automatic fire warning systems in all new single-family dwelling units built after December 31, 1981.

Codes

The fire marshal's office enforces the 1976 edition of the Fire Safety Code.

1981 Bill Introductions

HB.262 would require automatic fire warning systems in all new single-family dwelling units built after December 31, 1981. The bill was passed and signed by the governor June 29, 1981. The law, which can be found in Chapter 497, 1981 Statutes, became effective August 28, 1981.

Contact

Raymond Dewhurst
State Fire Marshal
Department of Safety
Concord, NH 03301
(603) 271-3336

New Jersey

Current Status

All new residential buildings and all multiple-dwelling units (hotels, motels, and apartment buildings) must be equipped with smoke detectors. The New Jersey law requires smoke detectors to be wired into an active electric circuit. The owner or manager of a building is responsible for maintenance, and in some cases, testing of the smoke detection units. The guide also gives specific direction for location and placement of the smoke detection units.

Codes

New Jersey enforces the 1978 edition of the Basic Building Code which is not subject to local administration.

1981 Bill Introductions

None

Contact

Charles Decker, Chief
Bureau of Construction Code Enforcement
P.O. Box 2768
Trenton, NJ 08625
(609) 292-6364

New York

Current Status

There are no statewide requirements for smoke detectors in residential buildings (due to recent changes in the New York State Sanitary Code). Hotels and motels which exceed 3 stories in height and have 75 or more sleeping rooms must be equipped with smoke detectors.

Codes

New York State has adopted the 1978 edition of the State Fire Prevention Code, which is designed to supplement the State Building Construction Code. Municipalities must adopt a resolution or local law accepting the applicability of the codes. These codes have been adopted by about 180 communities. New York has also adopted the 1- and 2-Family Dwelling Code which has provisions for smoke detectors in new single-family dwellings and multiple dwellings. About 725 communities have adopted this code.

1981 Bill Introductions

None

Contact

Francis A. McGarry, Director
Division of Fire Prevention and Control
New York Department of State
Albany, NY 12232
(518) 473-3590

Bennet Seslekof, Director
Codes Bureau
Two World Trade Center
New York, NY 10047
(202) 488-7080

North Carolina

Current Status

North Carolina requires smoke detectors in all new residential buildings through a mandatory statewide building code. Recent legislation requires owners of high-rise buildings to install smoke detection systems.

Codes

North Carolina has a mandatory state building code (based on the National Building Code of Canada) with stringent amendments for high-rise buildings which was adopted by the North Carolina Building Code Council in 1979. The code was challenged in court and stricken because of questions of legislative intent in giving the Council the authority to adopt codes. This session the legislature passed a bill specifically including the high-rise building amendments to the state code.

1981 Bill Introductions

SB.520, which would incorporate the building code titled, "Special Safety to Life Requirements Applicable to Existing High-Rise Buildings" into the general statutes of North Carolina, has passed. The effective date was June 29, 1981.

Contact

Kern E. Chruch
Acting State Fire Marshal
Box 26387
Raleigh, NC 27611
(919) 733-3901

North Dakota

Current Status

There are no requirements for smoke detectors in residential buildings. Hotels and motels must have smoke detection systems in each sleeping room. For the hearing impaired, at least one sleeping room must be equipped with a smoke detector capable of producing 85 decibels of sound at 10 feet and capable of flashing a 250-watt bulb for 5 minutes. Hospitals are also required to have smoke detection systems.

Codes

The state fire code is based on NFPA *101*. The state building code, which is mandatory throughout the state, is based on the 1978 edition of the Uniform Building Code. Both codes may be amended by localities as long as the amendments meet or exceed those of the State Building Code. Provisions for hospitals are found in the North Dakota Administrative Code.

1981 Bill Introductions

None

Contact

Vance Arneson
State Fire Marshal
Lock Box 1292
Bismarck, ND 58502
(701) 224-2434

Ohio

Current Status

Ohio has no smoke detector requirements for 1-, 2-, and 3-family residences. New and existing sleeping rooms in apartment buildings, hotels, and motels built after 1972 must be equipped with smoke detectors. All buildings over 75 feet in height are required to have smoke detection systems.

Codes

Ohio has a mandatory statewide building code based on the BOCA Building and Fire Codes. The code is part of the Ohio statutes. Sections of the BOCA code which conflict with the provisions of the Ohio Revised Code have been deleted. Local jurisdiction can adopt more stringent requirements than the state code. Local jurisdictions that adopt the state code may enforce it. Where the local jurisdiction does not adopt the code, the state enforces the code.

1981 Bill Introductions

None

Contact

Pete Ryan
State Fire Marshal
8895 E. Main St.
Reynoldsburg, OH 43068
(814) 864-5510

Oklahoma

Current Status

Oklahoma has no smoke detector requirements for residences. Smoke detectors are required in hospitals and other institutional care facilities.

Codes

Oklahoma is planning to adopt the 1981 edition of BOCA, but the requirements relating to smoke detectors will not be adopted. The state fire marshal's office has adopted the 1981 edition of NFPA *101* with all its smoke detectors' requirements.

1981 Bill Introductions

None

Contact

Jack C. Sanders
State Fire Marshal
4030 N. Lincoln Blvd.
Suite 100
Oklahoma City, OK 73105
(405) 424-4371

Oregon

Current Status

New residential buildings must be equipped with smoke detectors. All structures undergoing remodeling which costs 1,000 or more must be equipped with smoke detectors. In addition, all existing residential buildings, except owner-occupied single-family homes must be retrofitted. All rental dwelling units including hotels and dormitories must comply. Owner-occupied single-family housing must be retrofitted upon change of ownership. Details for placement and maintenance are included.

Codes

The state building code is a mandatory minimum/maximum code. All buildings, except residential buildings with less than 3 units, are regulated by the state fire marshal's office, through the Oregon Fire and Life Safety Structural Code. This code is based on the 1979 edition of the Uniform Building Code. The Oregon revised statutes gave the fire marshal's office the authority to adopt rules and regulations. Under an administrative rule, the fire marshal's office has adopted the latest edition of the *National Fire Code*.

1981 Bill Introductions

None

Contact

Clyde W. Centers
State Fire Marshal
103 Labor & Industries Bldg.
Salem, OR 97310

Pennsylvania

Current Status

There are no requirements for smoke detectors applicable to residential housing built on-site. Manufactured or industrialized housing must be equipped with smoke detectors as must personal care homes, boarding homes, and group (alcohol and juvenile treatment) centers.

Codes

The Industrialized Housing Division enforces the 1978 edition of the Basic Building Code for manufactured or industrialized housing. The other requirements are through the Pennsylvania Fire and Panic Regulations which were formalized May, 1981.

1981 Bill Introductions

None

Contact

Peter Petresky
Chief, Building Division
Bureau of Occupational & Industrial Safety
Department of Labor & Industry
Harrisburg, PA 17105
(717) 787-3806

Rhode Island

Current Status

All new and converted buildings used for residential occupancy must be equipped with smoke detection systems which must be hard wired into the electrical system. Child day-care centers, adult sheltered care homes, and places of public assembly must also be equipped with smoke detection systems. Existing structures must be retrofitted when a change in use or type of occupancy occurs.

Codes

The state fire marshal's office enforces the Rhode Island State Fire Safety Code which was enacted into law by the general assembly. The fire marshal's office is given the responsibility of new residential construction. Existing residential buildings are the responsibility of local minimum housing officers who enforce the Occupancy and Maintenance Codes. The smoke detector requirement in the 1975 edition of the BOCA code is used for high-rise buildings. The smoke detector requirements of the 1973 edition of the *Life Safety Code* are used for hospitals and nursing homes.

1981 Bill Introductions

H.5013, which would have required all existing 1-, 2-, and 3-family dwellings and all existing apartments with less than 8 living units to be equipped with smoke detector systems when a title is transferred as the result of a sale, did not pass.

H.5538 would have required every building containing 8 or more living units with independent cooking and bathroom facilities to have a fire alarm system installed. One provision would have required the installation of smoke detectors with A.C. primary sources of electric power, taken from a dependable commercial light and power supply source in each separate sleeping area. The bill did not pass.

H.5055 would require all new and converted residential buildings to be equipped with a smoke detection system. In addition, all existing residential buildings exceeding one story or floor would have to be equipped with smoke detection systems on each floor. The bill did not pass.

Contact

Earl F. Shannon
Division of Fire Safety
12 Humbert St.
North Providence, RI 02911
(401) 277-2335

South Carolina

Current Status

Every dwelling and dwelling unit within a hotel, motel, condominium, and apartment house must be provided with a smoke detector. Specific guidelines for placement and location are provided. There are no requirements of 1- and 2-family dwellings.

Codes

South Carolina enforces the 1976 editions of the Southern Standard Building Code and the Standard Fire Code Municipalities may adopt more stringent regulations if needed.

1981 Bill Introductions

None

Contact

Richard S. Campbell, P.E.
State Fire Marshal
1109 Mellview
Columbia, SC 29201

South Dakota

Current Status

There are no statewide requirements for smoke detectors in residential dwellings. The fire marshal's office highly recommends smoke detection systems be installed in apartment buildings, but this is voluntary. The health department enforces requirements for smoke detectors in hospitals, nursing homes, and other institutional facilities.

Codes

South Dakota has adopted the public building portion of the 1979 edition of the Uniform Building Code. (This code does not cover private dwellings). The fire marshal's office is trying to adopt the Uniform Building Code in its entirety. The health department enforces portions of the 1981 edition of NFPA *101*.

1981 Bill Introductions

None

Contact

Gene Uthe
State Fire Marshal
118 W. Capitol
Pierre, SD 57501
(605) 773-3562

Tennessee

Current Status

There are no requirements for smoke detectors applicable to any type of residential buildings. Only child day-care centers are required statewide to have smoke detection systems.

Codes

The state fire marshal's office enforces the 1973 edition of NFPA *101*. The state has also adopted the 1976 edition of the Standard Building Code. Neither code is mandatory. The office is in the process of adopting the 1981 editions of the *Life Safety Code* and the Standard Building Code.

1981 Bill Introductions

None

Contact

H.B. McPherson
Acting State Fire Marshal
Tennessee Building, Room 410
6th and Church St.
Nashville, TN 37219
(615) 741-2981

Texas

Current Status

Legislation requires smoke detectors in all rental or leased dwelling units constructed after September 1, 1981. Nursing homes and hospitals must have smoke detectors. There are no requirements for hotels and motels.

Codes

There is no statewide fire or building code in Texas. Nursing and convalescent homes are regulated by the Nursing and Convalescent Home Division of the Texas Department of Health which enforces NFPA *101*.

1981 Bill Introductions

HB.245 would have required a person owning a multiple-residence building and renting or leasing one or more units to others to install an approved fire detection and smoke alarm system that provides smoke warning to all residents of the building in each hallway connecting separate units. The bill was passed by the House but died in the Senate.

HB.2046 would require all dwelling units in rental or leased property constructed after September 1, 1981 to have at least one smoke detector installed by the landlord outside of each separate bedroom in the immediate vicinity of the bedroom. If the dwelling is designed to be a single multi-purpose room to be used for dining, living and sleeping, a smoke detector shall be located inside the room rather than outside. The bill became effective September 1, 1981.

Contact

Ernest A. Emerson
State Fire Marshal
1110 San Jacinto St.
Austin, TX 78786
(512) 475-4203

Utah

Current Status

Utah has no statewide requirements for smoke detectors in residential buildings. Hospitals, nursing homes, schools, places of public assemblege, and state-owned buildings must be equipped with smoke detectors.

Codes

Utah enforces the 1979 editions of the Uniform Building Code, the Uniform Fire Code, and the Mechanical Code. The fire codes are not mandatory in the state.

1981 Bill Introductions

None

Contact

Steve M. Kennedy
State Fire Marshal
101 State Capitol
Salt Lake City, UT 84114
(801) 533-5318

Vermont

Current Status

Vermont has no requirements for smoke detectors in residential buildings.

Codes

Vermont enforces the 1976 edition of NFPA *101* which covers public buildings.

1981 Bill Introductions

None

Contact

Richard D. Jones
Director of Fire Prevention
Department of Industry & Labor
118 State St.
Montpelier, VT 05602

Virginia

Current Status

Virginia requires smoke detectors in new residential construction. As of July 1, 1981, permissive legislation allows localities to adopt provisions requiring smoke detector systems to be installed in buildings retroactively.

Codes

Virginia has adopted the 1978 edition of the Basic Building Code which is a mandatory minimum/maximum code. Virginia also has a Fire Safety Law which has no provisions for smoke detectors. The code is currently under review and the state fire marshal's office may petition the legislature to revise the codes and the Fire Safety Law.

1981 Bill Introductions

None

Contact

Howard Summers
State Fire Marshal
205 N. 4th St.
Richmond, VA 23209
(804) 786-4751

Washington

Current Status

The state of Washington requires smoke detectors in all new residential buildings. Effective December 31, 1981, smoke detectors are required in all existing buildings other than owner-occupied, that is, all rentals must be equipped with smoke detectors.

Codes

Washington has included part of the 1976 Uniform Building Code in the state building code which is mandatory statewide.

1981 Bill Introductions

None

Contact

Thomas Brace
Chief State Fire Marshal
Insurance Building
Olympia, WA 98504
(206) 753-3605

West Virginia

Current Status

Smoke detectors are required in corridors of apartment buildings and in nursing homes, hospitals, and other institutional occupancies.

Codes

The state fire marshal's office enforces the State Fire Code which incorporates parts of the 1979 National Fire Code. The code excludes 1- and 2-family dwellings.

1981 Bill Introductions

None

Contact

Walter Smittle, III
State Fire Marshal
1800 Washington St., E
Charleston, WV 25305
(304) 348-2191

Wisconsin

Current Status

All new residential buildings are required to be equipped with smoke detectors. Mobile homes and manufactured housing must also be equipped with smoke detectors.

Codes

Two codes regulate buildings in Wisconsin. The 1- and 2-Family Dwelling Code is administered through the Department of Labor, Industry and Human Services. This code is also used for mobile and manufactured homes. Commercial buildings, including apartment buildings, are under the jurisdiction of the Department of Labor.

1981 Bill Introductions

None

Contact

Larry Litchfield
Department of Labor, Industry & Human Services
Safety of Building Division
201 E. Washington Ave.
Madison, WI 53701
(608) 266-3315

Wyoming

Current Status

Wyoming requires smoke detectors in all new residential buildings, including hotels and motels. Existing buildings must be retrofitted when remodeling requires a building permit and costs more than $1,000 or when 1 or more sleeping rooms are added to the building.

Codes

Wyoming has adopted the 1979 Uniform Building Code which is mandatory throughout the state. Municipalities may adopt more stringent restrictions.

1981 Bill Introductions

None

Contact

Billy M. Weckwerth
State Fire Marshal
Room 117, Hathaway Bldg.
Cheyenne, WY 82002
(307) 777-7288

Legislative Procedures

Ticket Citation Systems

The following departments have personnel experienced with managing ticket citation systems, and they may be contacted for information about those systems.

Division of Fire Prevention
2215 W. Old Shakopee Rd.
Bloomington, MN 55431
(612) 887-9633

Department of Fire
300 N. Main
Dayton, OH 45402
(513) 225-5344

Oklahoma City Fire Department
820 Northwest 5
Oklahoma City, OK 73106

Palm Springs Fire Department
300 N. El Cielo Rd.
Palm Springs, CA 92262
(714) 323-8181

Rancho Cordova Fire District
10595 Fulsom Blvd.
Rancho Cordova, CA 95670
(916) 363-3131

Reno Fire Department
200 Evans Ave.
Reno, NV 89501
(702) 785-2300

St. Paul Fire Department
101 E. 10th St.
St. Paul, MN 55101
(612) 224-7811

For an example of model legislation for establishing a citation program, see the 1980 Annual Report of the Uniform Fire Code Committee of the Western Fire Chiefs Association, published in the *Western Fire Chief*, July, 1980, pp. 53-58.

Residential Fire Safety

Home Certification Programs

The following departments may be contacted for information about home certification programs.

Westland Fire Department
36435 Ford Rd.
Westland, MI 48185
(313) 721-2009

Building Department
Westland, MI 48185
(313) 721-2009

Residential Code Enforcement Through Occupancy Permits

The following department may be contacted about residential code enforcement.

Director
Office of Planning and Development
69801 Delmar Blvd.
University City, MO 63130
(314) 862-6767

Remote Alarms

The following people may be contacted for information about cable systems that provide emergency alarm service by state, community, company, and type of service provided. For further information see: David B. Gratz and Ramond E. Hawkins, "Initial Report, A National Director of Automatic Detection, Suppression and Remote Alarm Systems," prepared for the Federal Emergency Management Agency, U.S. Fire Administration, August 1980.

Alabama
Red Bay TV Cable
Box 446
Red Bay
(205) 356-1241
Burglar Alarm and Police Surveillance
875 subscribers as of 1978

Alaska
M.2.P.D.C. Inc.
Star Route 50410
Fairbanks
(907) 372-4169
Fire, Burglar Alarm, Police Surveillance
1200 subscribers as of 1978

B.C. Cable Co., Inc.
Box 929
Juneau
(907) 486-3320
Fire Alarm
4,000 subscribers as of 1978

Arizona
Arizona Cable TV Inc.
Box 13741
Phoenix
(602) 257-0115
Fire and Burglar Alarm
145 subscribers as of 1977

Arizona Cable TV Inc.
Box 4185
Scottsdale
(602) 949-7852
Fire and Burglar Alarm
659 subscribers as of 1977

California
Dickinson Communication LTD.
18030 Beach Blvd.
Huntington Beach
(714) 842-4455
Fire, Burglar Alarm, Police Surveillance
number of subscribers unknown

Cable Service of Azuksa Inc.
916 Cherrystone Drive
Los Gatos
(408) 354-1880
Fire and Burglar Alarm
number of subscribers unknown

Florida
Computer Cable TV Inc.
1001 Roosmoor Circle
Coconut Creek
(305) 971-3500
Fire Alarm, Medical Alert, Police Surveillance
448 subscribers as of 1976

PGA Communications (planned)
address unknown
Palm Beach Gardens
(305) 627-1220
Fire and Burglar Alarms, Medical Alert, Police Surveillance

Selkirk Communications Ltd (planned)
address unknown
(305) 527-6600
Fire Alarm, Medical Alert, Police Surveillance

Georgia
City of Monroe, Water, Light and Gas Commission
215 N. Broad St.
Box 725
Monroe
(404) 267-3429
Fire and Burglar Alarm
1914 subscribers as of 1978

Kansas
Progressive Communications Inc.
Box 14
Burdett
Fire, Burglar Alarm, Police Surveillance
202 subscribers as of 1978

Lendsburg Cable TV
Box 18387
Wichita
(913) 227-2264
Fire and Burglar Alarm
204 Subscribers as of 1977

Smith Center Cable TV (planned)
Box 18387
Wichita
Fire and Burglar Alarm

Maryland
St. Charles CATV Inc.
St. Charles Communities
336 Post Office Rd.
Waldorf
(301) 843-8600
Fire and Burglar Alarm, Medical Alert
1859 subscribers as of 1978

Massachusetts
Colonial Cablevision of Revere, Inc. (planned)
334 Broadway
Revere
(617) 289-2288
Fire Alarm

New Hampshire
United Cable Co. of New Hampshire
Box 658
36 Hanover St.
Manchester
(603) 669-2115

New York
Rensselaer County Cablevision Corp.
Box 439
212 Broadway
Rennsselaer
(518) 293-6200
Fire Alarm, Emergency Alert
4205 subscribers as of 1978

North Carolina
Cablevision of Salisbury, Inc.
136 N. Green St., Box 1658
Salisbury
(704) 633-5484
Police Surveillance
2321 subscribers as of 1978

Ohio
Warner Cable of Columbus (planned)
Box 14468, 4284 N. High
Columbus
(614) 261-0001
Fire and Burglar Alarm, Medical Alert

Veacom Cablevision of Dayton (planned)
275 Leo St.
Dayton
(513) 223-8472
Fire and Burglar Alarm, Medical Alert

Tel Vu System Inc.
13765 N. Main St.
Weston
Burglar Alarm and Police surveillance
150 subscribers as of 1975

Oregon
C.B. Schrock & Associates, Inc. (planned)
2040 S.W. 187th St.
Aloha
(503) 649-2718
Fire, Medical and Police Security

Pennsylvania
Block Mountain Telecable Inc. (planned)
47 Main St.
Dallas
(717) 675-1171
Fire and Burglar Alarm, Police Surveillance

South Carolina
Cencom Inc.
Box 21368
Columbia
(803) 772-4020
Fire and Burglar Alarms
75 subscribers as of 1977

Texas
GRB Communications Inc. (planned)
Route 4, 6537 S. Stemmons
Denton
(817) 497-4055
Fire and Burglar Alarm, Police Surveillance

Wisconsin
Northern Lights Cable Corp. (planned)
Box 224
Presque Isle
(715) 686-2938
Fire and Burglar Alarms

RVS Cablevision Corp. (planned)
2767 Mayfair Rd.
Wauwatosa
(414) 259-1234
Fire and Burglar Alarm, Police Surveillance

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Gerard, John C. and A. Terry Jacobsen, "Reduced Staffing: At What Cost?" *Fire Service Today*, September, 1981.

National Conference of Counties, "A Study of Alternative Funding Sources for the Fire Service," 1980.

O'Hagan, John T. (Associates), "Boston Fire Department System Study," March, 1982.

O'Leary, Brian, *The Fertile Stars*, Everest House Publishers, New York, NY, 1980.

Renfro, William L., "Managing the Issues of the 1980's," The Futurist, World Future Society, Bethesda, MD, August, 1982.

Sanders, Jack C., John C. Gerard, Harry Shaw, and Harry Carter, "Conservatism and Local Government: The Tax Squeeze and Local Fire Safety Delivery Systems," (A Panel Discussion), First Batterymarch Conference, Quincy, MA, June, 1981.

Simon, William E., *A Time for Action*, Berkley Publishing Corp., New York, NY, 1981.

Ulrich, Richard L., "The Fire Problem: Economic Impacts and Innovative Approaches," National League of Cities, Washington, DC, 1980.

Wilmot, Tom, "European Fire Costs - The Wasteful Statistical Gap," Association de Geneve, October, 1979.

Mini-Guide for Fire Protection Master Planning

Master planning is an on-going process that allows a community to determine the level of service it needs and desires from a fire protection system. Through community fire department interaction, the best combination of several programs available is selected to become the planned fire protection delivery system for the community. Continual evaluation of the plan allows for alteration of programs to meet unusual developments or the unexpected.

How Master Planning Works

The following is a brief overview of the major steps in the planning process. Steps indicated by * are major milestones in the process at which time approval, changes, and input are sought.

1. Determine the need for master planning Is the community getting the best fire protection for the tax dollar? Is the fire department getting sufficient support from city hall and the public?

2. Get approval and support from community administrative office (city manager, mayor, county board of supervisors, etc.) This support is vital for the success of master planning.

3. Select planning team and advisory committee members Personnel from the fire department, other agencies and the general populace should be considered.

***4. Define the fire problem(s)** Through data analysis, community survey, fire incident review, etc.

***5. Establish goals and objectives** Goals are broad, philosophical statements that reflect the mission of the fire department as well as the needs of the community. Objectives are more specific statements that suggest methods to reach a goal. Program alternatives are developed from each objective.

***6. Select program alternatives** Alternatives for reaching each objective are reviewed by the Planning Team and selected according to approved selection criteria. The plan written for final approval contains the best combination of alternatives.

***7. Seek approval and implement the plan** The community fire protection master plan needs the support of the citizens as well as elected officials and fire departments.

***8. Evaluate periodically and revise as necessary** Evaluation is necessary to check the progress of the fire protection system being implemented. Because communities are constantly changing, new construction, shifts in population, and other variables affect fire protection. The master plan must reflect these changes to assure that the community is receiving the level of service it needs and deserves.

Where to Get Help

Technical assistance in master planning is available through NFPA's Technical Support Program (TSP). TSP can help communities gain a clearer understanding of their current fire problems and fire protection system. TSP can provide training in techniques for master planning and plan presentation as well as an assessment of the planning effort at various points in the process. In addition, the community planning team and fire officials have access to NFPA's Advisory Service for answers to technical questions involving code enforcement/inspection, investigation, and data analysis.

NFPA's Technical Support Program has assembled a cadre of specialists who have been involved in master planning and fire protection locally and regionally and who are ready to advise other local fire department and community leaders on how to increase the effectiveness of local fire protection.

The Technical Support Program can assist the community in solving its own fire protection problems. TSP may also help the community in seeking further assistance for a particular issue (such as fire station location) from trained fire protection engineers and others. In any case, TSP can help communities more clearly identify and define local fire protection problems and needs.

Inquiries concerning master planning or technical assistance should be directed to:

James C. Smalley, Manager
Technical Support Program
National Fire Protection Association
Batterymarch Park
Quincy, MA 02269
(617)328-9290

Computer Use in the Fire Service

Among the applications of new technology that local fire departments have taken advantage of to assist and improve their operations are computer-based information systems. Computer systems have been used for management information reporting, resource planning, and operational support. Data management systems represent some of the most successful applications. Fire incident reporting systems such as the National Fire Protection Association (NFPA) Uniform Fire Incident Reporting System (UFIRS) and U.S. Fire Administration (USFA) National Fire Incident Reporting System (NFIRS) are among the best known. NFPA has also developed a computer-based Fire Inspection Reporting System (FIRS). Management planning and evaluation tools include Public Technology, Inc.'s Station Location Package, NFPA's Fire Alarm Assignment System (FAAS), and Computer-Aided Dispatch System (CADS).

Computers can serve a number of functions in the fire service. Many of these are record-keeping functions. Among them are:

incident reports
casualty reports
prefire plans
fire inspection reports
equipment and apparatus inventory
equipment and apparatus maintenance/test
personnel records
duty rosters
training records
property inventory
financial records/budget
time accounting

Other functions that can be served by computers are:

dispatching and status keeping
locating fire stations and apparatus
office automation/word processing
training simulation
arson prediction

Glossary

(Adapted from *Desktop Computing* which publishes a quarterly update of computer terminology.)

Some of the common terms encountered in the computer environment are explained here to assist in understanding.

BIT: The contraction of "binary digit." A bit always has the value zero or one. Bits are universally used in electronic systems to encode information, orders (instructions), and data. Bits are usually grouped in bytes (8).

BYTE: A group of eight bits treated as a unit.

COMPILER: A translation program that converts user-developed instructions into a set of binary instructions for execution by the computer.

CPU: Central processing unit. The computer module in charge of fetching, decoding, and executing instructions.

CRT: Cathode ray tube. A video screen on which data or information is displayed.

DISK: A round plastic platter on which data is stored.

DISK DRIVE: The machinery that contains and rotates a floppy diskette or hard disk onto which data is written and from which data is read.

DOCUMENTATION: Instructions and other explanatory materials supporting computer hardware and software.

DUMP: To copy the contents of memory or disk to video display, printer, or storage device so that it can be checked out in detail or kept as back-up.

FILE: A logical block of information, designated by name, and considered as a unit by a user. A file may be physically divided into smaller records.

I/O: Input/Output. The communication of information to and from a computer or peripheral device.

INPUT DEVICE: Any machine or piece of equipment associated with a computer that allows you to enter commands or information into the computer's Random Access Memory. A keyboard is an input device.

INTEGRATED CIRCUIT: A complex, microscopic circuit on a chip of silicon.

INTERFACE: The hardware and/or software required to interconnect a peripheral device to a computer system.

KILOBYTE: "Kilo" means 1,000, but "Kilobyte" means precisely 1,024 bytes.

LANGUAGE: Any unified, related set of commands or instructions that the computer can accept. Low-level languages are difficult to use, but closely resemble the fundamental operations of the computer. High-level languages resemble English.

LOAD: The action of transferring data or a program into a memory area.

LOGIC: The term used to designate that part of the computer's circuitry that makes logical decisions.

LOGICAL DECISION: The capability of the computer to decide if one quantity is greater than, equal to, or less than another quantity and then use the outcome of that decision as a cue to proceed data in a given way with a program.

MACHINE LANGUAGE: Set of binary codes representing the instructions that can be directly executed by a processor.

MAIN MEMORY: The internal memory of the computer contained in its circuitry, as opposed to peripheral memory (diskettes, disks).

MENU: A list of programs or applications that are available by making a selection.

MERGE: A computerized process whereby two or more files are brought together by a common attribute, as zip codes in ascending numerical order.

MODEM: Modulator-demodulator. A device that transforms a computer's electrical impulses into audible tones for transmissions over a phone line to another computer. A modem also receives incoming tones and transforms them into binary impulses that can be processed and stored by the computer.

NETWORK: Several intelligent devices, such as microcomputers, interconnected so that they can send instructions and data back and forth among themselves, thus forming a larger computational system.

ON LINE: Directly connected to the computer system and in performance-ready condition.

OPERATING SYSTEM: Software required to manage the hardware and logical resources of a system, including scheduling and file management.

OUTPUT DEVICE: A machine that transfers programs or information from the computer to some other medium. Examples of output devices include printers, CRT screens.

PERIPHERAL: Any device connected to a computer. Examples include disk drives, tape drives, printers, CRTs.

PLOTTER: A mechanical device for drawing lines under computer control.

PROGRAM: A sequence of instructions that read, process, and/or display data in a form designated by the user.

RANDOM ACCESS: An access method whereby each work can be retrieved directly by its address.

RAM: Random Access Memory. That portion of a computer's main memory in which data can be randomly accessed.

READ: To accept data from a disk, card, etc., for storage and/or processing.

REAL TIME: Immediate and concurrent processing.

RECORD: A block of information unique unto itself. Many records about similar things constitute a file.

RESOLUTION: The quality of the image on the CRT.

ROM: Read Only Memory. That portion of a computer's main memory where program instructions are stored while being used.

SEQUENTIAL ACCESS: The method in which data is accessed by scanning blocks or records sequentially by some identifier.

SIMULATION: A computerized reproduction, image or replica of a situation or set of conditions.

SOFT COPY: Information contained magnetically in storage. Magnetic storage is on disk or tape.

SOFTWARE: Computer programs.

TRANSFERABLE SOFTWARE: Usable on many different computers.

WRITE: To transfer data from internal to external memory.

Types of Systems

Today, there are three types of computer systems that the fire service may have the opportunity to use. These are the mainframe-type computer, the mini-computer, and the microcomputer. Briefly defined, these are:

Mainframe: A large computer capable of handling many tasks at a single time with access to massive storage on disk or tape and supporting many terminals, printers, and other peripheral equipment. The mainframe requires special air conditioning and cooling and is housed in an environmentally controlled room. These systems generally require a staff of systems analysts, programmers, and operators to function.

Mini-computer: A medium size computer either dedicated to a single task or capable of performing multiple tasks simultaneously. Mini-computers can have access to massive storage on disk or tape and can support numerous terminals and other peripheral equipment. Generally, the mini-computer does not require the same amount of cooling and may or may not require housing in an environmentally controlled room.

Microcomputer: The microcomputer, sometimes called a personal computer, is designed to perform basically one task at a time. Storage is limited and usually involves floppy disks although hard disks capable of more storage are now available. Microcomputers need neither special electrical connections nor special environmental control. A typical system involves a single terminal, a printer, and some storage device such as a floppy disk.

All three types of systems are currently used in the fire service. Where mainframe computers are used, they are generally shared with other municipal departments. The same is true with mini-computers, although some fire departments have mini-computers dedicated to supporting dispatch functions with record-keeping done on the back-up computer. Microcomputers are now beginnning to be used in the fire service for record-keeping functions.

Software

Three examples of readily available computer software for fire service record-keeping functions are the Uniform Fire Incident Reporting System, the National Fire Incident Reporting System, and the Fire Inspection Reporting System. A brief description of each system follows:

Uniform Fire Incident Reporting System (UFIRS)

The Uniform Fire Incident Reporting System (UFIRS) is a modern, scientific management tool that enables any municipal or county fire department to collect, classify, and report fire and other incident data using the community's computer as a tool to process the data. UFIRS provides important information for fire chiefs and community managers to use in planning, decision-making, and performance evaluation.

Classification of data within UFIRS is based on NFPA 901, *Uniform Coding for Fire Protection*, and the system is compatible with the National Fire Incident Reporting System (NFIRS) which is currently in use in many states.

UFIRS is a total package containing the computer programs, system documentation, and data collection forms to implement the system. The computer programs edit data, build and maintain files, and generate a series of 13 summary reports monthly. The documentation, which is contained in eight volumes, guides the user in the installation, operation, and support of the system; the training of users in preparing data, quality control, and using the results in management decision-making; and in handling the day-to-day operation within the fire department.

The 13 monthly summary reports can be used by the fire chief to:

- Spot rising trends in particular community fire problems.
- Identify and describe local fire problems.
- Plan the fire protection needs in the community.
- Support budget requests.
- Target fire prevention efforts to specific fire protection problems.
- Document and justify enforcement of local building, firesafety, and life safety codes.
- Evaluate code enforcement programs.
- Demonstrate the need for additional local ordinances on firesafety.
- Reduce fire casualties by identifying and correcting casualty-causing conditions.
- Allocate personnel and equipment more effectively.
- Schedule nonemergency activities to avoid peak emergency periods.
- Provide input for state reporting systems.
- Compare fire protection and prevention problems and solutions with those of other communities.

UFIRS is a tested and proven way to aid in the planning, decision-making, and problem-solving so necessary with each one of these management responsibilities.

Fire departments where UFIRS is currently in use include:

Albuquerque, NM
Anaheim, CA
Anne Arundel County, MD
Baltimore County, MD
Bellevue, WA
Berkeley, CA
Chesterfield County, VA
Columbia, MO
Dallas, TX
Denver, CO
Elizabeth, NJ
Everett, WA
Fort Worth, TX
Fresno, CA
Greensboro, NC
Houston, TX
Jacksonville, FL
Kansas City, MO
Kitchener, Ontario
Lansing, MI
Lincoln, NE
Linden, NJ
Louisville, KY
Madison, WI
Mountain View, CA
New Orleans, LA
Oakland, CA
Palo Alto, CA
Pittsburgh, PA
Portsmouth, VA
Rockford, IL
Sacramento, CA
San Jose, CA
Santa Barbara County, CA
Saskatoon, Saskatchewan
Syracuse, NY
Torrance, CA
Tulsa, OK
Wichita, KS

UFIRS was originally developed by the NFPA with funding from the U.S. Department of Housing and Urban Development. The NFPA has continued to maintain and upgrade the system. Further information on UFIRS and its application in a community may be obtained from Carl E. Peterson, National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

National Fire Incident Reporting System (NFIRS)

The National Fire Incident Reporting System (NFIRS) is an incident data collection system designed to process data from local fire departments at the state level, to pass that data base on to the federal level for use in studying the national fire problem, and to provide summary reports for use by state and local governments in better understanding their fire problem. Developed and administered by the Federal Emergency Management Agency, the system is operational or in the process of installation in 40 states. In addition, several large cities have installed the system on a computer in their communities and are using it as the basis of a local reporting system.

NFIRS is based on the work of the NFPA Technical Committee on Fire Reporting, utilizing the definitions, terminology, and data classification system presented in NFPA 901, *Uniform Coding for Fire Protection* and the forms and instructions presented in NFPA 902M, *Fire Reporting Field Incident Manual.*

Local communities with automated reporting systems based on NFPA 901, whether UFIRS, NFIRS, or a locally developed system feed information directly to the state on computer tape. Other fire departments submit copies of their fire reports directly to the state where the data is keypunched and processed.

The system is similar to UFIRS in that it contains 1) the computer programs to build and maintain a data base and to report from that data base; and 2) the support documentation for installation, training, operation, and use of data.

Further information on the National Fire Incident Reporting System can be obtained from the Federal Emergency Management Agency, Washington, DC 20472.

Fire Inspection Reporting System (FIRS)

The NFPA Fire Inspection Reporting System (FIRS) is designed for the collection, storage, and processing of inspection data and the scheduling of periodic inspections ACcording to local policy. All data (occupancy, description, activity, and violations) are collected on a standard form during an inspection. A convenient pocket-sized inspection manual is compiled that systematically organizes potential code violations by occupancy, allowing for more comprehensive and standardized inspections. After the inspection forms are completed, they are (computer) processed according to local needs.

A series of management reports are produced that relate to inspection activity and prevention personnel resource allocation. In addition, separate master file listings can be maintained about occupancies currently under inspection, all occupancies to be inspected, and when there are outstanding violations to be corrected during follow-up reinspections. FIRS shows the manager:

- What is inspected, where, when, and by whom.
- What code violations are corrected by type, number, and in what type of occupancy.
- How the fire department utilized its resources to accomplish fire prevention program objectives.

The FIRS package includes eight volumes of documentation, computer programs, and test data and six days of on-site support.

This system is an efficient and cost-effective method for keeping accurate and complete records of inspected occupancies. It saves inspector time, and provides data in a form useful for operational management decision-making. As the most current and accessible data-based inventory of occupancies available, it provides information for fire protection fiscal and long-range master planning. It is a system designed for use during suppression and prevention operations and brings to the fire service, other public code enforcement agencies, and to industry the opportunity to use a process and information previously unavailable.

Fire service agencies using the Fire Inspection Reporting System include:
Alberta Fire Marshal's Office, Alberta, Canada
Greensboro Fire Department, NC
Houston Fire Department, TX
Minneapolis Fire Department, MN
San Diego Fire Department, CA
San Francisco Fire Department, CA
San Jose Fire Department, CA
Toledo Fire Department, OH
Warwick Fire Department, RI

Further information on the Fire Inspection Reporting System and its application in a community can be obtained from Carl E. Peterson, National Fire Protection Association.

Fire Station Location Package

Using the Public Technology, Inc. (PTI), Fire Station Location Package, local administrators and fire officials can evaluate the adequacy of fire station locations — both present and planned — on response time rather than distance requirements to maximize fire protection.

Utilizing a project team composed of fire officials, support staffs, and representatives of top management, the process provides a focal point for fire officials and local administrators to reach common agreement on the level of service which is to be provided in the community.

The PTI Fire Station Location Package can be used to aid decisions on the least expensive alignment of fire stations necessary to meet local fire protection requirements. The package allows a municipality to develop a configuration of stations which recognizes "response time" as the single most important ingredient in saving lives and reducing fire damages. Depending on local conditions, the alignment of fire stations may be less, more, or the same number of stations that a locality has now, but it will be based on an objective appraisal of local needs.

The package can assist a community to:

- measure the effectiveness of current deployment
- compare alternative site options
- determine effects of annexation or development
- plan for the future

The package is structured around a computer program which utilizes "response time." The package includes orientation and training sessions, documents, forms, worksheets, computer programs, and (if necessary) technical assistance. The strategic siting of fire stations is based on the inherent time requirement of any human occupancy or property for fire protection. This is defined independent of any specific station location proposal or national standard.

Local government personnel survey their community to collect data on hazards to life and property. Inherent requirements for a quick response may be dictated by the type and age of each structure, frequency of use, and other factors. Additional data are collected on possible fire station sites and characteristics of the local street system. Based on this analysis, local administrators and fire officials can specify how fast fire apparatus must respond to a fire alarm or other service call. This constraint is called the response time requirement. The computer-generated data summaries are then used to measure the consequences of alternative proposals.

However, the package does not make decisions. Careful interpretation yields a clear understanding of the options available. Decisions are made by interpreting the imbalances that occur between the "supply" of station sites and the "demand" for fire protection. Decision makers themselves select the proposal that meets local objectives for fire protection.

Additional information on this package is available from:
Public Technology, Inc.
1301 Pennsylvania Ave., NW
Washington, DC 20004
202-626-2400

Fire Alarm Assignment System (FAAS)

The Fire Alarm Assignment System (FAAS) is a systematic process for planning, evaluating, and constructing an emergency alarm assignment street file. A completed file contains recommendations about which fire companies should respond and which companies should be relocated in an emergency dispatch. In summary, FAAS facilitates planning and carrying out variations in fire alarm assignment that support dispatch and suppression activities. Work on FAAS was sponsored by the United States Fire Administration.

The planning consists of defining policies that are the basis of constructing the assignment file. Once policy is defined, an efficient and accurate method for testing and implementing needed policy changes is provided by FAAS.

The successful implementation of FAAS requires the use of a geocoded street file, such as the U.S. Census Bureau's DIME file, and digitization (assignment of x and y coordinates) to a map overlay of response zones. The documentation for the System guides the user through the various steps necessary, and on-site technical support is available to assist with implementation.

The System can be used in both planning and operations to determine fire department resource deployment. The System provides:

1. Improved accuracy, consistency, and accessibility of fire alarm assignment files.
2. Easy updating of fire alarm assignments as new streets are added, new fire stations built, or new areas annexed.
3. A method of timely evaluation of alternatives in dispatching policy or resource allocation.
4. A file and associated response and relocation logic, which can be used with an on-line system for computer-aided dispatching.

Reports generated by FAAS show the effect of individual station locations, including each company's associated travel time, as well as the combined results of response and relocation assignments. The final product is a street file with fire company response and relocation assignments through five alarms that could be used for manual or computer-aided dispatch. Additional information can be generated, such as the average response time to first due areas and comparisons of response times to each section of the city.

The Fire Alarm Assignment System was tested and is operational in Tacoma, Washington.

Further information on the Fire Alarm Assignment System is available from Carl E. Peterson, National Fire Protection Association.

Computer-Aided Dispatch System (CADS)

A Computer-Aided Dispatch System (CADS) is an information processing system to support dispatch operations. CADS uses information entered by operators from communication devices (telephones, alarm systems, radios, etc.) and drawn from computer files (street and other locations, assignments, and status files). This information (location and type of emergency, status changes, etc.) is used to prepare recommendations for assignment (output) to assist in dispatch decisions. The system recommendations are then accepted or modified by dispatch personnel. The final dispatch decisions regarding resource allocations are then sent over communications devices (radios, teletypes, etc.) to field units. CADS, therefore, becomes an integral part of the communication system, and increases its information-processing capabilities.

Since the early 1970s, several communities have installed computer systems to improve communications and dispatch operations. The degree to which these systems support operations ranges from basic information processing to totally interactive decision support systems. The development, design, and installation of a system is costly, requires unusual project management capabilities, takes several years to implement, and may significantly change the policy and procedures used in emergency operations.

A CADS takes advantage of computer technology to offer alternative methods of executing various tasks by adjusting constraints. The kinds of improvement in the dispatch operation that can be expected from implementation of a CADS are:

1. **Accuracy.** CADS eliminates many efforts such as repeated handling of forms, time stamping, and copying of information from one form to another. Automatic editing of invalid codes, street addresses, and unit designations assists the dispatch operator.

2. **Operator Performance.** Many tedious, repetitive, clerical tasks are eliminated or simplified, allowing the dispatcher to concentrate on decision-making and communication activities, thus improving field unit support.

3. **Speed.** Many tasks are performed more quickly than under manual operations (e.g., file accessing and incident record updating), making it possible to perform some tasks not previously possible (additional data on hazards, prior or simultaneous nearby events checks) due to the size of the data base and time required. CADS can reduce the time required to receive information and to send information to field units.

4. **Span of Control.** It provides a more efficient way of maintaining the status of units and incidents.

5. **Paperwork Reduction.** The resulting data bases can be used to generate management reports that summarize activity at desired intervals (daily, monthly). The data forms the basis of an automated incident reporting system.

6. **Expansion of Capabilities.** The ability of a computer to perform many tasks without operator intervention can enhance the dispatch environment including: automatic status map and display; fire station printers or display terminals; and mobile digital terminals.

In 1978, the National Fire Protection Association (NFPA) organized a consortium of communities which contracted with NFPA to provide guidance in the project management, specification, procurement, and installation of a fire CADS.

The goals of this study were to:

1. Identify and document, through analyses of existing, operating CADS and other sources, methods and procedures that at least accomodate the needs of the participating communities and lead to successful project management, functional analysis and description, system specification, procurement and installation of a fire CADS.
2. Provide information and techniques for comparing various alternatives to CADS design.

Three documents that resulted from this study contain a guide that suggests several alternatives and the trade-offs of each selection. In some cases, actual examples are provided and the user must review, edit, or modify the presentation. In most cases, an agenda or recommended order of tasks to be executed are described. Lists of considerations and their implications are described in sufficient detail to guide the user, designer, and other technicians in installing a CADS. Copies of these three volumes are available from the NFPA, Batterymarch Park, Quincy, MA 02269, Attention: Public Fire Protection Division.

Volume I, PROJECT MANAGEMENT GUIDE, focuses mainly on the problems associated with executing a complex, technical project. Guidelines for anticipating and avoiding problems in planning, scheduling, developing and implementing a CADS are presented. A description of the role of a project manager and skills of various team members provides the framework for developing and assigning discrete tasks.

Volume II, SYSTEM DESIGN GUIDE, organizes "how to" of every task from functional analysis to final system acceptance and maintenance. Procedures required in performing a functional analysis are provided with examples of how to create objective statements, performance criteria, and breakdowns of functional requirements. A detailed functional description is provided as a model with instructions for comparing and modifying it to reflect local operations. A technique for translating this description into a system specification is presented with examples. The minimum contents of a Request for Design are described with examples or guidelines for their development. Other important concerns regarding system reliability, training, data bases, maintenance, etc. are also addressed.

Volume III, PROCUREMENT GUIDE, provides a device for communicating the procurement process to the users and computer technicians. The form and content of contracts for computer system design, hardware purchase, and software development are described for the procurement specialist. The benefits and procedures of a negotiated procurement are recommended as a method for acquiring the most desirable system at a reasonable cost.

Computers are being used in a number of communities to assist in dispatch operations. Some of these communities are:

Citrus Heights, CA
Centereach, NY
Dallas, TX
Huntington Beach, CA
Indianapolis, IN
Los Angeles, CA
Los Angeles County, CA
Memphis, TN
Minneapolis, MN
New Castle County, DE
New Orleans, LA
New York, NY
Oklahoma City, OK
Phoenix, AZ
Reno, NV
San Francisco, CA
San Jose, CA
Washington, DC

Microcomputer Use

The greatest technology advances in computers in the past few years have been in the area of the microcomputer. These systems can make computing power available to a local fire department at prices well within its financial means. Turn-key application software specifically designed for fire service application is just starting to be developed, but generalized software for building data bases, financial calculation, or word processing is readily available for most microcomputers. The Office of Fire Protection Management, United States Fire Administration, Federal Emergency Management Agency has recently prepared a paper on the "Microcomputer and the Fire Service." The paper will aid persons desiring to use microcomputers in selecting both hardware and software to best meet their needs. Copies of this paper are available from the NFPA Public Fire Protection Division. The following list is reprinted from that paper. It lists currently identified users of microcomputers and commercial applications available for microcomputers.

Arizona

Bruce Varner, Fire Captain
Phoenix Fire Dept.
1250 E. Windsor
Phoenix 85006
(602) 262-6297
TRS-80 Model I

Robert Weber, Chief
Lake Havasu City Fire Dept.
145 N. Lake Havasu Ave.
Lake Havasu City 86403
(602) 855-1141
TRS-80 Model I

Matt Mastriano, Technical Service Supervisor
Tucson Fire Dept.
265 S. Church
Tucson 85721
(602) 791-4804
TRS-80 Model II
Original Programs:
  Medical System
  Flow Information
  Inspections

California

Norma Calvi, Command Center Manager
U.S. Forest Service
San Bernadino National Forest
144 N. Mountain View
San Bernadino 92408
(714) 383-5588
FTS 793-5654
Apple II Plus
Original Programs:
  CAD, Initial Attack Dispatch
  Vendor Contracts
  Telephone Directory
  Personnel
  RESTAT
  Fire Activity Statistics

Dave Dowling, Dispatcher
San Bernadino Fire Dept.
Communications Center/Fire Dispatch
104 W. 4th St.
San Bernadino 92401
(714) 383-3707
TRS-80 Model III
Original Programs:
  Resource Status
  Emergency Resource
  Multi-Casualty Distribution

Connecticut

John Yost, Chief
Norwalk Fire Dept.
121 Connecticut Ave.
Norwalk 06854
(203) 866-3312

Florida

Charles Shipman
Lutz Volunteer Fire Dept.
Lutz 33549
(813) 949-3436
Apple II
Original Program:
  Statistical Package,
suitable for small communities

Edwin Spahn, Chief
Orange County Fire and Rescue
66 E. Center Blvd.
Orange 32801
(305) 420-4262
TRS-80 Model I

Gary Briese
803 Alfred Dr.
Orlando 32810
(305) 647-0351
Apple II

Timothy Stillman
Institution of Fire Engineers
60 Hendricks Isle
Ft. Lauderdale 33301
(305) 467-2301
TRS-80 Model I

Georgia

Lou Cuneo, Chief
Atlanta Fire Dept.
25 Claire Dr.
Atlanta 30315
Apple II Plus
Original Program:
  Personnel/Training

Illinois

Ron Dukes, Chief
Glenside Fire Dept.
1608 Bloomingdale Rd.
Glendale Heights 60137
(312) 668-5323
TRS-80 Model II
Original Programs:
  Fire Response Statistics
  Ambulance Response Statistics Records

Kansas

John Bode, Lieutenant
Wichita Fire Dept.
455 W. Main St.
Wichita 67202
(316) 268-4451
Altair 8800
Original Program:
Physical Fitness

Leon Stitt
Department of Emergency Communications
535 N. Main
Wichita 67203
(316) 268-4329
TRS-80 Model II

Maryland

John Hess, Instructor
University of Maryland
Department of Fire Science
College Park 20742
(301) 454-2416
Original Program: (for Atari)
Fire Simulation

Warren Isman, Chief
Montgomery County Department of Fire and Rescue Services
101 Monroe St.
Rockville 20850
(301) 251-2444
Atari 800
Original Programs:
Catalogue & Inventory
Training Examinations

Massachusetts

Gerald LaFlamme
Shrewsbury Fire Dept.
P.O. Box 275
Shrewsbury 01545
(617) 842-6640
Digital

Paul LaLonde, Lieutenant
Amherst Fire Dept.
69 N. Pleasant St.
Amherst 01002
(413) 253-3431

Missouri

Lloyd Monroe, Chief
Kansas City Fire Dept.
414 East 12th St.
Kansas City 64106
(816) 274-2347
274-1240
Apple II Plus

Rich Fagan
Lee's Summit Fire Dept.
207 S. Douglas St.
Lee's Summit 64063
(816) 251-2343
Motorola
Original Program:
Computer-Aided Dispatch

Robert Lowe
Sni Valley Fire Protection District
1601 Broadway
Oak Grove 64075
TRS 80 Model 16

New Jersey

Thaddeus T. Lowden
Marlton Fire Dept.
26 East Main St.
Marlton 08053
(609) 983-2210

New York

Gary Darling
Bainbridge Fire Dept.
W. Main St.
Bainbridge 13733
(607) 729-2551
TRS-80 Model I

Robert Elling
Regional Emergency Medical Organization
22 Warehouse Row
Albany 12205
(518) 459-8251
TRS-80 Model II

Mike Semel
Elmira Volunteer Fire Dept.
421 Highland Ave.
Elmira 14905
(607) 734-0766

Matthew Shulman
Lansing Fire Dept.
80 Ridge Rd.
Lansing 14882
(607) 533-4118
Apple II

Jerry Laughlin
Fire Engineering Magazine
875 Third Ave.
New York 10022
(212) 605-9400
Apple II

North Carolina

Kathleen Loewy
6419 Teague Lane
Charlotte 28215
(704) 535-5581
TRS-80 Model II

Ohio

Bernard Conine
Fostoria Division of Fire
233 W. South St.
Fostoria 44830
(419) 435-3206

Gordon Hartschuh
Bath Fire Dept.
3864 W. Bath Rd.
Akron 44313
(216) 666-3733
TRS-80 Model III
Original Program:
  Incident Statistics

Oregon

Grant Smith, Chief
Canby Fire Dept.
230 S. Grant
Canby 97013
(503) 266-5851
Apple II Plus

Gerald Pyle, Training Officer
Tualitin Fire District
P.O. Box 127
Tualitin 97062
(503) 682-2601
Apple II Plus

Pennsylvania

Robert S. Goeltz
Hermitage Fire Dept.
2511 Highland Rd.
Hermitage 16148
(412) 342-0669
Commodore P&T, Model 2001

John L. Rickey, President
Neshannock Volunteer Fire Dept.
315 Old Mercer Rd.
New Castle 16105
(412) 654-7409

S.E. Schopfer, Operations Manager
Lycoming Emergency Services
48 W. Third St.
Williamsport 17701
(717) 327-2447

South Carolina

Floyd Yocum
272 Bay Tree Lane
Myrtle Beach 29577
Apple II

Tennessee

Dr. David Icove
Knoxville Arson Task Force
Department of Public Safety
800 East Church Ave.
Knoxville 37915
(615) 521-1200
TRS-80 Model II
Original Program:
  Arson Pattern Recognition System

Ed Chapin
Chattanooga Computer Center
807 Market St.
Chattanooga 37402
(615) 756-3233
Apple II
Original Programs:
  Rescue
  EMS
  Fire Training
  Fire Simulation

Texas

Ed Hawk, System Coordinator
Houston Fire Dept.
333 Preston
Houston 77002
(713) 222-4631
TRS-80 Model III

Bobby C. Moore, Deputy Chief
Dallas Fire Dept.
2014 Main St.
Dallas 75201
(214) 670-4311
Apple II

Virginia

Timothy Butters
Burke Volunteer Fire Dept.
9501 Burke Lake Rd.
Burke 22105
(202) 287-0795
TRS-80 Model II
Original Programs:
  Master Planning
  Hazardous Materials
These programs are available through FEMA.

Jim Hicks, Assistant Chief
Alexandria Fire Dept.
900 2nd St.
Alexandria 22314
(703) 838-4600
Dyna-Byte

Kenneth Lavoie, Chief
Hampton Fire Dept.
Hampton 23669
(804) 727-6580
IBM Display Writer

Bruce Roemmelt, Major
EMS Training Coordinator
Prince William County Fire and Rescue Service
9300 Lee Ave.
Manassas 22110
(703) 369-9300
TRS-80 Model II

Joseph Saitta
EMS Management Institute
107 East Holly Ave., Suite 12
Sterling 22170
(703) 450-6097
Apple II Plus

Washington

R. O. Duncan, Chief
Bothell Fire Dept.
10726 Beardslee Blvd.
Bothell 98011
(206) 468-1678
Apple II
Original Programs:
  WFIRS Reporting
  Fire Flow Calculations
  Flow Testing Calculations
  Data Base Inventory
  Hydrant Testing Records
  Hose Testing
  Fire Investigation

Ron Klimmel
Washington Fire Service Training
Airdustrial Park Blvd.
17LS10
Olympia 98504
(206) 753-5679
Apple II Plus

Les Flue, Chief
Parkland Fire Dept.
100 S. 114th St.
Tacoma 98444
(206) 537-8530
Apple II

Philip Lund
Thurston County Medic One
413 Lilly Rd.
Olympia 98506
(206) 753-8246
Apple II
Original Program:
  Medical Reporting

Robert Hays
Bellevue Fire Dept.
666 Bellevue Way, SE
Bellevue 98004
(206) 455-6982
Apple II

Joe Parrott
Lacey Fire Dept.
P.O. Box 3366
Lacey 98503
(206) 491-2410
Apple II
Original Program:
  Training

Wyoming

Randy Vickers, EMS Director
Laramie Fire Dept.
P.O. Box C
Laramie 82070
(307) 721-5232
TRS-80 Model II
Original Program:
  Fire Simulation

Microcomputer Training Courses

California

Ted Gold, Fire Service Coordinator
Indian Valley College

Ignacio Blvd.
Novato 94947
(415) 883-2211

Maryland
Michael Fay, Faculty Member
National Fire Academy
16825 S. Seton Ave.
Emmitsburg 21727
(301) 447-9600
(800) 638-9600

Ohio
Robert Taylor, Operations Supervisor
Ohio Fire Academy
8895 East Main St.
Reynoldsburg 43068
(614) 864-5510

Commercially Available Programs

California
Robert J. Bernard
Franklin Computer Systems, Inc.
715 Fremont Ave.
South Pasadena 91030
Available Programs for Dec PDP 11 16 Bit Micro:
  EMS Programs
  Billing
  Activity Analysis
  Paramedic Procedures
  Certificates & Licenses
  Vehicle Maintenance

Colorado
Clifford Harvey, President
FireMeasure, Inc.
1090 Edinboro Dr.
Boulder 80303
(303) 441-3351
Applesoft Programs:
  Building Fire Safety Assessments
  Code Violations

Illinois
Robert Kula
Comprehensive Systems, Inc.
142 Hawley St.
Grayslake 60030
(312) 223-2811
Available Programs:
  NFIRS 902 F & G
  Emergency Systems
  Pre-Fire Planning
  Inventory
  Personnel & Training

Michigan
Robert Tidmore
Marmen Computing
125 6th Ave.
Menominee 49858
(906) 863-2611

New York
Tom Van Destowe
Binary Technology Enterprises, Inc.
171 Hawkins Rd.
Centereach 11720
(516) 981-8568
(516) 588-5836 MODEM Line
Available Program:
  EMS Package for TRS-80 I & III

Oregon
Mary Pyle
Fire Service Training Programs
P.O. Box 22405
Milwaukee 97222
(503) 659-9030
Programs Available:
  Applesoft Programs
  Fire and Life Safety for Elementary Schoolers

Pennsylvania
John Armstrong, President
Customized Business Control, Inc.
2827 Truman Dr.
Hatfield 19440
(215) 362-2123
Available Programs:
  Fire Reports
  Personnel
  Scheduling
  Inventory Management

Texas
Nathan R. Gehman
Fire Service Consultants
1520 N. Frazier
Suite 191
Conroe 77301
(713) 756-1411

The National Interagency Incident Management System

Source: Forest Service, U.S. Department of Agriculture

The National Interagency Incident Management System (NIIMS) was designed by a group of local, state, and federal agencies, responsible for fire protection in order to help improve the ability of fire protection forces to respond to any type of emergency. While NIIMS is a new system, it includes the best features of two existing fire suppression management systems currently in use in the U.S. NIIMS includes interactive subsystems that help to make a comprehensive emergency management system.

Although NIIMS was developed by fire protection agencies, the same management concept can be used to respond to public emergencies of any type. Using the principles outlined in NIIMS, national disasters such as floods, hurricanes, and earthquakes, and local situations in which several jurisdictions are involved, such as tornadoes, major aircraft accidents, and hazardous material spills all can be managed more efficiently.

The National Interagency Incident Management System consists of five major subsystems which collectively provide a total system approach to all risk incident management.

Following are brief descriptions of the subsystems:

- The on-scene management structure is called the Incident Command System. This system includes operating requirements and interactive components for organizing and operating the system.
- Standardized training supports the effective operation of NIIMS.
- A recommended Qualification and Certification subsystem provides personnel meeting standard training, experience, and physical requirements to fill specific positions within the Incident Command System.
- A Publications Management subsystem includes development, publication, and distribution of NIIMS materials.
- Other supporting technologies such as Orthophoto Mapping, Infrared Imagery, Multiagency Coordination, or a Decision-Making Process can support NIIMS.

Each of the subsystems of NIIMS must be interactive. Each supports the other. This is the strength of NIIMS.

The federal wildland fire protection agencies and some state forestry agencies have for many years operated under the Large Fire Organization (LFO). This organization, when coupled with the National Interagency Fire Qualification System (NFIQS) developed by the National Wildfire Coordinating Group (NWCG)* is a complete fire management system. However, the terminology and the organizational structure are barriers to coordination with fire departments and other emergency services. In addition, the qualification and certification system (NIFQS) caused difficulty in integrating state and local forces in suppression efforts.

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*NWCG was chartered in 1972. Its function and purpose is to establish an operational group designed to coordinate fire management programs of the various participating agencies; to avoid unnecessary duplication; to provide a means for the participating agencies to constructively work together; and to facilitate a "total mobility" concept. Its goal is to provide more effective execution of each agency's fire management program. Membership of NWCG consists of officials from each of the following agencies:

Bureau of Indian Affairs
Bureau of Land Management
National Park Service
Fish and Wildlife Service
National Association of State Foresters
Forest Service
A representative from the Federal Emergency Management Agency also participates.

The fire services in southern California have operated for several years under the Incident Command System (ICS). The ICS, which was developed by those partner agencies, provides a common emergency management structure for the agencies which must work together in a crisis. It is another proven organization; however, it lacks a qualification and certification system, and thus, it is incomplete.

By 1980, NWCG realized that two parallel systems were being developed. They commissioned a study to: (1) analyze fire suppression systems developed and in use, and (2) pull together the better parts of those systems into a single system that would have national acceptance. The National Interagency Incident Management System is the result of that effort.

The adoption and implementation of NIIMS are proceeding faster than anticipated. It is truly an interagency effort with full NWCG support. The federal agencies that have adopted NIIMS include the Forest Service, National Park Service, and Bureau of Indian Affairs. The Bureau of Land Management is analyzing the system and is expected to make a decision later this year (1982). The Fish and Wildlife Service will adopt it on a refuge-by-refuge basis to coordinate with their neighboring agencies.

There are twelve states that have expressed an interest in adopting NIIMS in the near future. Three of these — California, Colorado, and Florida — have implementation plans in progress. Others are planning implementation within the next few years. Most of these states plan to implement the system with all emergency services included.

The concepts associated with NIIMS are not new, but are a refinement of what is already being done. However, NIIMS offers a flexibility which provides many advantages over existing systems, such as the ability for local emergency services to respond jointly in a more effective and efficient manner. With the adoption of NIIMS by emergency service agencies, cooperative association previously unknown will evolve.

Estimation of Dollar Losses Due to Fire

Adequate reports of estimated fire losses are important in the fire data collection process at the local, state, and national levels. They provide a measurable basis for recording the severity of a loss, and the mechanism through which degrees of damage to similarly constructed buildings can be measured and compared.

Property loss is generally regarded as the cost to replace real property (structures) and personal property (contents), damaged or destroyed. In most cases, the estimated value of loss should be based on the current cost to rebuild the structure or replace the contents using the commonly accepted insurance definition: "...with material of like kind and quality within a reasonable period of time after such loss....."[1] In cases where there is partial fire, smoke, or water damage (i.e., damage confined to the object or area of origin of the fire, or any damage less than total), the approximate estimate should be based on the extent of damage observed at the site of the loss.

Market value estimates are not a valid method of establishing fire loss for real property. Market value is generally based on an agreed price for transfer of property between a willing buyer and a willing seller, each under no duress. This value usually has no direct relationship to construction or replacement costs. It typically incorporates the value of land with the value of the structure. It is also a function of the trend of the economy at the time of the sale and what the market will bear.

There are several methods for determining property loss values. Published guides are available which present the methods (see Reference list which follows this article). The values presented here represent the cost to reconstruct a typical single-family wood frame dwelling as it existed before the fire, including the costs of materials, labor, and other contractors' cost factors. The values are based on costs in the Boston area, but should be typical for most large metropolitan areas. The costs may be adjusted for individual localities with factors supplied by the sources mentioned in the Reference list. An alternative to this method would be for the local fire department to prepare similar tables for the immediate area covered, with the assistance and cooperation of local contractors and merchants. Municipal building departments will also have a knowledge of local construction costs.

Estimating Structural Loss in Single-Family Dwellings

The values tabulated here correspond with four grades or classes of dwelling construction as described in Robert S. Means' *Residential Cost Data — 1982.*[2] Determination will need to be made as to the original quality of the workmanship of the dwelling: Economy, Average, Custom-Built, or Luxury. For the purpose of this discussion, the following are presented as general definitions of the building classes common to *residential* construction.

Economy Class: An economy class residence is usually mass-produced from stock plans. The materials and workmanship are sufficient only to satisfy minimum building codes. Low construction cost is more important than distinctive features. Design is seldom other than square or rectangular.

Average Class: An average class residence is simple in design and is built from standard designer plans. Materials and workmanship are average, but often exceed the minimum building codes. There are frequently special features that give the residence some distinctive characteristics.

Custom Class: A custom class residence is usually built from a designer's plans which have been modified to give the building a distinction of design. Material and workmanship are generally above average with obvious attention given to construction details. Construction normally exceeds building code requirements.

Luxury Class: A luxury class residence is built from an architect's plan for a specific owner. It is unique in design and workmanship. There are many special features, and construction usually exceeds all building codes. It is obvious that primary attention is placed on the owner's comfort and pleasure. Construction is supervised by an architect.

The following table may be used as a guide for quick estimates of loss for typical single-family wood frame dwellings. It is stated in 1982 dollars per square foot and is based on the total square footage of living area only. The living area is a sum of all the levels of functional living space (ceiling height of six feet or more) expressed in square feet. Values for roofs, attics, and basements have been distributed proportionately throughout the living area. The averages presented will fit most situations, except the very extreme at each end of the scale. Loss to other buildings on the property such as garden sheds, detached garages, etc., must be estimated separately based on size and information available locally.

In estimating a dwelling loss less than 100 percent, the percent of loss can be expressed as the ratio of fire damaged area to the total square footage of the dwelling.

EXAMPLE: The second floor of a one-and-a-half-story average class dwelling is totally destroyed by fire. The total living area of the dwelling is 1,800 square feet. The loss is estimated to be one third of the total living area. A detached one-car garage is also destroyed.

Table 1
TYPICAL RESIDENTIAL CONSTRUCTION COSTS — 1982 * SINGLE-FAMILY WOOD FRAME DWELLINGS; DOLLARS PER SQUARE FOOT OF LIVING AREA **

Class of Construction	Levels of Living Area				
	One Story	One-and-a-Half-Story (Finished Second Floor)	Two-Story	Bi-Level	Tri-Level
Economy	$32.30	$24.00	$28.85	$24.20	$23.00
Average	33.90	29.65	29.50	27.60	26.75
Custom	39.40	32.70	33.45	32.75	32.45
Luxury	50.35	45.90	45.95	42.20	40.10

*Source: R. S. Means, *Residential Cost Data-1982*, 1st Annual Ed., Robert Snow Means Co., Inc., Kingston, MA, 1982, pp. 184-203.

**Values for roofs, attics, and basements have been distributed throughout the living area.

From Table 1, the estimated structure loss for the dwelling may be determined as follows:

average class one-and-a-half-story dwelling @ $29.65/SF
second floor living area ⅓ × 1800 SF = 600 SF
Estimated structure loss to dwelling = $29.65/SF X 600 SF
= $17,790, say $18,000.

Additionally, the one-car detached garage was totally destroyed. An on-site approximation of loss based on size and typical construction costs for a wood frame detached garage was estimated at $6,000.

The total estimated structure loss at the property would be:

TOTAL ESTIMATED STRUCTURE LOSS = DWELLING LOSS + ADDITIONAL STRUCTURE LOSS (Garage)
= $18,000 + $6000
= $24,000.

The values in the table are reasonable estimates for most metropolitan areas. Where it is known that unusual labor or material supply problems exist, the values may be increased slightly to a maximum of plus 5 percent. In southern states, these values may be decreased slightly to a maximum of minus 10 percent, with a total of minus 15 percent being applicable in very rural southern areas. The values in the table are valid only for 1982. Local real estate personnel, municipal building departments, insurance agents, or contractors will usually be able to provide the percentage increases to be applied to the values for succeeding years for their respective areas. Also, published estimating guides list the locality adjustment factors by metropolitan area according to postal zip codes.

Estimating Contents Loss in Single-Family Dwellings

Structural loss is only part of the loss picture. It is also necessary to estimate the value for loss to contents. This task is not as straightforward as estimating structural loss, but generally it represents a smaller number.

For reporting purposes, if an accurate estimate of contents loss cannot be made by the owner or some other appraiser, a "ballpark" estimate of loss may be made by estimating the loss on a room-by-room basis. The table presented below has been prepared to provide

Table 2
TYPICAL VALUES OF FURNISHED ROOMS — 1982 DOLLAR ESTIMATES

Class of Construction	Type of Room						
	Living Room	Dining Room	Kitchen	Bedroom (Each)	Full Bath (Each)	Den	Family Room
Economy	$ 4,500	$ 3,500	$ 4,000	$3,000	$3,000	—	—
Average	7,500	5,000	6,000	4,000	3,500	—	$4,000
Custom	10,000	7,500	8,000	5,000	4,000	$ 6,000	5,000
Luxury	15,000+	10,000+	10,000+	7,500+	5,000+	10,000+	7,500+

Notes:

For combination rooms, use a percentage of each type of room receiving the damage. For example — an eat-in kitchen value could be approximated by ⅔ kitchen value + ⅓ dining room value.

Percentages should be adjusted to each individual situation at the discretion of the reporting individual.

rough estimates of the loss for typical rooms in single-family dwellings. The values are approximate for basic room furnishings and should serve only as a guide to reasonable values of furnishings. Items incorporated into these values include the costs of furniture, kitchen appliances, televisions, radios, drapes, lamps, dishes, tableware, clothing, and other items essential to a typical functioning household.

The values in the table were based on 1982 observations of contents in dwellings of each building class using generally accepted insurance appraisal techniques. When no specific information is available to the reporting official as to the nature of contents destroyed, the contents value may be approximated between 30-50 percent or more of the structure value. (Insurers typically allow a value of personal property at 50 percent of real property value.) However, this technique should only be used as a last resort in estimating loss to furnishings and other contents. There will always be discussions regarding the values of personal property destroyed in a fire, but for reporting purposes, these estimates will suffice.

EXAMPLE: In the previous structural loss estimate example, where the second floor of a one-and-a-half-story average class dwelling was damaged by fire, the following rooms were destroyed; two bedrooms and a full bath.

From Table 2, the estimated contents loss for the dwelling may be determined as follows:

2 bedrooms @ $4,000 each = $8,000
1 full bath @ $3,500 = $3,500
Estimated Contents Loss = $11,500*

*This estimate does not take into account depreciation in the value of contents.

TOTAL ESTIMATED DWELLING LOSS = TOTAL ESTIMATED STRUCTURE LOSS + ESTIMATED CONTENTS LOSS
=$24,000 + $11,500
=$35,500.

In round numbers, the estimated loss to the dwelling would be $35,000. These values are strictly estimates to be used when approximating fire losses from notes taken at the site of the fire. They should be applied with discretion and modified as necessary by the reporting individual based on the actual observations of the property damage noted at the fire scene.

In addition to this total, allowance must generally be made for smoke, water, and fire control damage based on observations made at the fire scene.

There are more experienced and qualified individuals, such as appraisers and adjusters, who are trained in their respective professions to properly determine property values and to make appropriate settlements of loss. Due to their training and expertise, these individuals can determine the value for the insured loss; they should be contacted when a more accurate value of the loss is necessary.

With notes taken at the site and simple tables to assist in determining the value of the loss, losses to single-family wood frame dwellings can be estimated easily and with confidence. For analytical purposes, the values derived in this manner will have more significance than verbal generalizations of damage, such as "slight," "moderate" or "heavy." Resulting dollar estimates will enable fire loss associated with fire spread to be analyzed.

Industrial and Commercial Property Loss Appraisal

Industrial and commercial property evaluations are much more involved and the values represented are in general significantly higher than residential values. Estimating procedures similar to those presented here for dwellings may be used, although it will be necessary to go to commercial estimating guides to get reasonable approximations for the values involved for contents as well as for industrial or commercial type building construction. (see Reference list at the end of this article).

Salvage should be considered when estimating partial losses. It is the responsibility of the insurance adjuster to adequately determine the amount of salvage for any loss; the methods are varied and depend on the wording of the insurance policy.

In addition to direct property losses from fire already discussed, there are losses of an indirect nature. Indirect costs of fire losses extend beyond lives lost, injuries, and property damage. Especially for commercial and industrial situations, substantial economic losses occur which impact both businesses and the communities they serve. The following two lists[3] present types of indirect losses.

Losses to the Fire-damaged Business

Business interruption as a result of a fire may have one or more of the following effects:

1. Loss of customers.
2. Loss of return on capital investment.
3. Loss of profits on finished goods.
4. Loss of investors' confidence.
5. Loss of credit standing.
6. Loss of goodwill of customers, employees, and the community.
7. Loss of trained personnel who transfer to other jobs.
8. Cost of retaining key personnel during shutdown.
9. Loss of productive services of key personnel retained during enforced shutdown.
10. Seizure of fire insurance payments by uneasy creditors.
11. Excessive replacement costs due to overtime, inability to buy at time most advantageous to buyer, etc.
12. Cost of demolition.
13. Cost of replacing depreciated buildings and equipment with new facilities.
14. Continuance of fixed charges during shutdown.
15. Cost of hiring temporary quarters.
16. Loss of valuable records, EDP storage, one of a kind molds, and other items that cannot be replaced or can be replaced only at a great cost.
17. Loss of earning power of patents, trademarks, etc.
18. Loss of value of past advertising.
19. Inability to defend against unjust claims due to loss of records.
20. Loss of rent from tenants.

Losses to the Community

The business itself and the employees involved are not the only "losers" in the event of a fire. The whole community also suffers in the following ways:

1. Loss of circulation of employees' payroll.
2. Increased burden on welfare and unemployment compensation funds.
3. Loss of business by suppliers of raw materials and services to fire-damaged plant.
4. Loss of labor market.
5. Loss of taxes on destroyed property.

For fire-damaged businesses, the economic impact of indirect losses manifests itself in many ways, as the lists enumerate. The losses disturb the consumer base which provided the lifeblood of cash flow for the business and retard the opportunity for a speedy recovery from the fire. With such interruptions to the normal course of business, consumers find other suppliers with goods and services more readily available. This, in turn, slows the recovery even more. When the business re-opens, the consumer base is not automatically restored and the lost market share may never be recovered. These types of indirect losses can certainly hinder a financially weakened business that does not carry adequate insurance to relieve some of the fire loss burden.

The community suffers both economic and emotional losses. Displaced workers who cannot find replacement jobs may decide to move to another area of the country with better employment opportunities. Shrinking community size places additional burdens on the remaining population.

It is easy to see that indirect losses have far-reaching repercussions and some of these losses do not become evident until years after their occurrence. This fact, together with the uncertainty and fluctuation of the economy, makes the estimation of indirect losses very difficult to assess in terms of fixed dollar amounts. For these reasons, the values of indirect losses are generally excluded from discussions of fire loss estimating. The evaluation of these losses is left to the appropriate experts in the field of insurance and economics. Such indirect losses require thorough analysis on a case by case basis.

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Additional Reading

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Fire Departments with Modern Training Facilities

Alexandria, VA
Charlotte, NC
Montgomery Country, MD
Oklahoma City, OK

Fire Departments Using Fire Simulators for Training

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Fire protection educators accreditation
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Carl E. Peterson

Liaison with fire service organizations and government agencies

Joseph M. Redden, Ass't. Vice President, Public Protection Division

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Chief Dominique Gonthier
SVC. Prot. Con L'Incendie
140 Rue St. Jean
(418) 694-6158

Scarborough, Ontario M1P 4N7
Chief William E. Wretham
Scarborough Fire Dept.
740 Markham Rd.
(416) 438-1231 (Dept)
(416) 282-1686 (Chf)

Toronto, Ontario M5H 2N2
Chief Bernard A. Bonser
Toronto Fire Dept.
100 Queen St.
(416) 367-7693

Vancouver, British Columbia V6A 3S7
Chief Norman K. Harcus
Vancouver Fire Dept.
900 Heatley Ave.
(604) 665-3420 (Dept)
(604) 665-3425 (Chf)

Windsor, Ontario N9A 1H7
Chief Kenneth G. Stewart
Windsor Fire Dept.
815 Goyeau St.
(519) 255-6470

Winnipeg, Manitoba R3B 1L1
Chief T. L. Moist
Fire Dept. Headquarters
Public Safety Bldg., 5th Floor
151 Princess St.
(204) 985-6380

Fire Chief's Corner

In 1982, NFPA staff interviewed eight fire chiefs across the United States to find out what kinds of problems they had faced in 1982, what kinds of training, fire prevention, and public education programs they had conducted during the year, and what kinds of books, films, and other training aids they had liked using most. The chiefs represent areas of the country from Alaska to Arkansas, and their views present an interesting profile of the U. S. fire service today.

Anchorage, Alaska

Chief Robert W. Howell
Anchorage Fire Dept.
Administrative Offices Building
211 W. 7th Ave.
Anchorage, AK 99501

Department Information

Anchorage population: 220,000
1 paid Fire Chief
1 paid Deputy Chief
100 fire fighters
36 paramedics
6 mechanics
36 inspectors/administrators
80 auxiliary/volunteer: 22 EMTs, 58 volunteer fire fighters
18 first-line engines
3 first-line ladders
5 first-line ambulances
3 ambulances: volunteer/auxiliary
1982 budget: $25,367,000
1983 budget: $28,047,000

Biggest Problem

- Adverse weather conditions during the long, cold winters.
- Arson.

Training Program

- A full-time battalion chief is the training officer.
- Anchorage has a 6 million complex for training facilities that covers the south, central region of Alaska. Anchorage is in charge of administration of the entire complex in return for use of the complex.
- Training includes both academic and practical aspects of fire fighting.
- Anchorage has an extensive library of training films.

Fire Prevention Program

- This department consists of 14 full-time people headed by the Assistant Fire Chief.
- Anchorage has 2 full-time plan review specialists who evaluate new construction plans prior to giving the builder a permit. They also conduct final inspections.
- They are responsible for code enforcement.
- They inspect triplexes and up on an annual basis. Single-family dwellings and duplexes are not inspected.

Public Education Program

- This is a branch of the fire prevention program. Two part-time people staff this department.
- Anchorage uses a Code-A-Phone system, where daily fire and paramedic activity is recorded onto a phone number. The media and the community have access to this phone number. Many radio stations put the recording on the air. Anchorage has established a strong rapport with the media.
- 164 school presentations were made in the month of October.
- They have implemented the Learn Not to Burn curriculum.

Miscellaneous

Anchorage expects an increase of $3.5 million in the 1983 budget.

Boise, Idaho

Chief John Boros
Boise Fire Dept.
520 Idaho St.
Boise, ID 83702

Department Information

Boise population: 102,000
1 paid Fire Chief
2 paid Deputy Chiefs
3 Battalion Chiefs
30 Captains
45 Senior fire fighters (Drivers)
53 fire fighters
1 Communication Officer
9 Fire Dispatchers
1 Drill Master
1 Training Officer
1 Supt. of Maintenance
3 Maintenance Personnel
1 Fire Marshal
4 Fire Inspectors/Investigators
9 fire stations
1 ladder company in service
8 engine companies in service
3 crash trucks in-service (C.F.R. emergencies)
1982-83 Budget: $5.5 million

Biggest Problems

- Arson (related to structure fires).
- Heating systems (related to wood-burning stoves, fireplaces, chimneys, furnaces).
- Open flame (related to fireworks, smoking materials).
- Lack of funds in Department. In 1979, 27 fire fighters were laid-off and 56 demolitions were encountered. (This occurred due to implementation of a 1 percent Initiative Law passed by Idaho).

Training Program

- Crash fire rescue training. IFSTA 206, NFPA Codes and Standards, as well as the FAA and the National Transportation Safety Board programs are used.
- Boise sends fire fighters to the National Fire Academy.

Fire Prevention Program

- The Fire Prevention Bureau is heavily involved in Code enforcement. Boise follows the Uniform Fire Code, (1982 edition), and NFPA pamphlets.
- All commercial, industrial, institutional, assembly, and residential structures are inspected yearly. Individual residences are inspected on a voluntary basis.
- In 1983, the Fire Prevention Bureau will train fire suppression crews to perform routine inspections on a fire crew level in their respective districts.
- In 1983, the Fire Prevention Bureau will train fire suppression crews in fire investigation techniques.

Public Education Program

- An active fire prevention campaign is launched during Fire Prevention Week.
- Film showings are conducted for community and school groups.
- An intensive year-round fire prevention public education program complete with remote educational devices is scheduled for 1983. A concentrated effort will be made to educate the children and students in the schools.

Miscellaneous

- Chief Boros believes that the fire service should make a strong effort in training staff and mid-management personnel in the future, so they may be prepared to cope with the economic changes faced by the fire service today.
- Better communication with management and employees will play an important role in the future of the fire service.
- Boise has seen a decrease in arson losses and an increase in arson convictions.
- The Department has had big gains in code compliance. In 1982, over 6,000 smoke detectors were installed in individual apartment residences.

Lexington, Kentucky

Chief Earl R. McDaniel
Lexington Fire Dept.
219 E. 3rd St.
Lexington, KY 40508

Department Information

Lexington County Population: 250,000
1 Fire Chief
1 Deputy Chief
3 Assistant Chiefs
7 Battalion Chiefs
19 District Chiefs
401 fire fighters
5 arson specialists
Community divided into 4 districts
15 stations
7 aerial ladder companies
3 squirts
2 hose trucks
7 ambulances[1] - 4 front-line units and 3 back-up units
1982 budget: $12 million

Biggest Problem

Low income housing.

Training Program

- Described as "the best in the country" by Chief McDaniel.
- Their recruitment program requires that a fire fighter put in 400 hours of training before riding a rig.
- Training is done in high-rise towers, smoke and fire buildings, and in multi-office buildings as part of their indoor winter training program.
- 3 people attended the National Fire Academy in 1982.
- Lexington serves as host to the State Fire School. Each June 1500 fire fighters from across the state arrive in Lexington for a 24-hour course run by the Department, the University of Lexington, and the State Fire Marshal.
- The new state law requires that each fire fighter have at least the minimum hours of training to be certified. Certification requires at least 700 hours of training, and then 100 hours each year after the original certificate is issued.

---

[1] Lexington has a paramedic program which has an approved license to administer medical attention to injured victims of fire. The Advisory Board consists of 10 leading area physicians who monitor the program.

Fire Prevention Program

- A full-time bureau of 16 people is responsible for the fire prevention program in Lexington.
- Every building in the city area is inspected twice a year.
- Lexington has a home inspection program that allows residents to have their homes inspected yearly if they choose to. This program has been in existence for over 20 years.
- Lexington enforces all NFPA codes.

Public Education Program

- Lexington has a fire brigade training program in which the fire fighters go into businesses and train people how to organize a fire brigade.
- Fire education programs are conducted throughout the school system.
- The fire department sponsors a "Babysitter's Course" which includes training in fire prevention and first aid. The course is very popular in the County.
- The Fire Department sponsors the Hartford Insurance Jr. Fire Marshal's program.

General Information

Lexington has not been hit by the current recession. High-rise buildings are growing in conjunction with the urban renewal program for the city. The department is fully staffed. All construction plans for the city are reviewed by the department which is very involved in the urban renewal movement. The department has completed the demolition of 450 major buildings.

Miscellaneous

- The Lexington Fire Department has an extensive library of films and publications which are available to schools and the community.
- It has a new innovative program, computer dispatch, that is in the trial stage.
- Lexington has a master planning program to determine the best building (least hazardous) up to the most hazardous in each block of built-up area.

Morristown, New Jersey

Chief Albert Hopping
Morristown Fire Dept.
161 Speedwell Ave.
Morristown, NJ 07960

Department Information

Morristown population: day: 100,000 night: 15,500
1 paid Fire Chief
20 paid fire fighters
200 volunteer fire fighters listed; 30 active volunteers
4 engines
1 snorkel
1 ladder
Morristown Ambulance Squad (separate from the fire department); 4 ambulances (volunteer)
1982 budget: 930,000 including salaries

Biggest Problems

- Low income housing.
- Older homes.

- The Chief's main concern is the lack of manpower, which is not only a problem in Morristown, but is rampant throughout New Jersey. Morristown lost four men in 1982 and they have not been replaced.

Training Program

Morristown has an in-house training program. Fire fighters also attend the Morris County Fire Academy. Three men attended the National Fire Academy in 1982.

Fire Prevention Program

Due to budget cuts, there is no fire prevention program.

Fire Education Program

The fire education program is shared with the Morris County school district.

Miscellaneous

An interesting fact about Morristown is that the daytime population is larger than the nighttime population due to the number of corporations and offices. The Morristown Fire Department is working closely with ATT and other corporations to prevent fires.

Paradise, California

Chief James Gilpatrick
Paradise Fire Dept.
767 Birch St.
Paradise, CA 95969

Department Information

Paradise population: 25,000
1 paid Fire Chief
34 paid Fire fighters
30 volunteer fire fighters
3 fire stations
1 ladder
3 first-line engines
EMT 1 level: Department works closely with the local ambulance service.
1982 budget: $1.2 million

Biggest Problem

Paradise is located in the Sierra Nevada foothills. It is a large population in a timbered area. Consequently, there are structural and wildland fire problems.

Training Program

- Paradise does 90 percent of its own training. Fire fighters are encourged to attend the fire science program at the local community college. The department has developed its own programs and uses its own photographer to develop slides and films.
- Fire fighters also attend the State Fire Training programs as well as the National Fire Academy.
- Paradise has its own training tower.

Fire Prevention Program

- The Paradise Fire Department has developed a Home Fire Inspection Program that runs from early spring until the summer.
- Paradise is one of the few cities/towns in California to pass a fire retardant roof ordinance.

Public Education Program

- Paradise has proclaimed October as Fire Prevention Month. Programs are presented to every grade school student in the town.
- In the past, the public education programs were geared more toward entertainment, now they are geared to be educational as the Learn Not to Burn program has been implemented. As Chief Gilpatrick states, "Every child in Paradise knows how to Stop, Drop, and Roll."
- Paradise works actively with the elderly and owners of health-care facilities enforcing the *Life Safety Code* and educating the elderly about fire.

Miscellaneous

- Favorite tactics book - *Fire Tech, Command Decisions and Cooperative Operations* by Kimballs.
- Chief Gilpatrick would like to see a training program for volunteer chiefs to give them more direction.

Port Gibson, Mississippi

Chief Sam Jennings
Claiborne County Fire Dept.
412 Main St.
Port Gibson, MS 39150

Department Information
Claiborne County population: 12,000
1 paid Fire Chief
4 paid fire fighters
4 volunteer fire fighters
3 engines
1982 Budget: $70,000

Biggest Problem

- During the dry season, the main fire problems are brush and forest fires.
- During the winter, the main problem is chimney fires.

Training Program

All fire fighters attend the State Fire Academy in Jackson, Mississippi.

Fire Prevention Program

Chief Jennings inspects buildings on a volunteer basis as requested by insurance companies or the occupants themselves.

Public Education Program

Chief Jennings conducts classes with students in nursery schools, kindergartens, and grade schools.

Springdale, Arkansas

Chief Mickey Jackson
Springdale Fire Dept.
Central Station
417 Holcomb St.
Springdale, AR 72764

Department Information

Springdale population: 25,000
1 paid Fire Chief
1 Assistant Chief
41 full-time fire fighters
8 volunteer fire fighters
4 engines, 1 reserve
no aerials
1 snorkel
3 paramedic squads
1 rescue unit
4 stations in the city
1982 budget: $910,296

Biggest Problem

- Springdale had arson problems up until 1982, but the number of arson incidents has decreased significantly.
- The worst problem the Department currently faces is the shortage of manpower.

Training Program

Chief Jackson believes his training program is achieving the desired results. He is pleased with the level of training and capabilities of his Department. He is especially impressed with the Department's competence in the emergency medical services area. He feels that his Department has been fortunate to have had numerous training "burns" in recent years.

Fire Prevention Program

- The Fire Department inspects buildings periodically.
- Chief Jackson would like to be more active in this area, but is limited in his activities due to shortage of funding and manpower.

Public Education Programs

- Works with local industries on industrial fire brigade training.
- Springdale is active in educating the elementary school children using the Children's Television Workshop materials. They were one of the earliest participants in this program.
- Springdale frequently gives EMS presentations to schools at all levels and to various other community groups.

Miscellaneous

Chief Jackson believes that the EMS is "the strength of his community." He feels that all fire companies should be actively involved in the EMS program.

Tiffin, Ohio

Chief Thomas Huss
Tiffin Fire Dept.
53 S. Monroe St.
Tiffin, OH 44883

Department Information
Tiffin population: 19,567
1 paid Fire Chief
1 paid Deputy Chief
6 Captains
2 stations
3 fire fighter/mechanics
19 regular fire fighters
2 first-line engines
1 reserve engine
2 aerials
1 converted army truck (M-220 Shop Van) converted for multi-purpose use such as scuba team equipment
3 ambulances: city owned, but under the jurisdiction of the fire department
  manned by 2 off-duty fire fighters
  manned by 5 off-duty police officers
  manned by 13 people from the private sector
1982 Budget: Fire fighting $635,062; Ambulance $216,877

Biggest Problem

- Solid fuel stoves.
- Portable kerosene space heaters.
- Money shortage in Department.

Training Program

- Ohio law requires that all career fire fighters have a minimum 200-hour recruit training *within their first year of service.* Some of the major cities require the training before recruit is assigned to a company.
- Training is normally done by crew officer with "in-service" personnel.
- No one serves in the position of training officer.
- Periodically, outside experts, such as people from the State Fire Marshal's Office and local utilities such as Ohio Power Company conduct training sessions.

Fire Prevention Programs

- The state of Ohio requires that persons making "firesafety inspections" be certified by the state.
- All 6 captains are certified by the state of Ohio and are assigned a number of properties to inspect each year.
- All inspections are "in-service" inspections conducted by an on-duty engine company.
- The information obtained from these inspections is kept up-to-date on station run cards.

Public Education Programs

- The Tiffin Fire Department uses as many visual aids as it can. The visual aid that is most often used in conjunction with station tours for kindergarten children is the "Donald Duck Survival Plan."
- They conduct fire drills and tornado drills in the schools.
- Tiffin has topical information published in the local newspaper and broadcast on the local radio station to inform the public of seasonal firesafety problems as well as year-round safety information.

Miscellaneous

Two favorite books of Chief Huss are *Fire Protection Handbook* and *Fire Chief's Handbook.*

Careers in the Fire Service

Careers in the Municipal Fire Service

A career in the fire service in the 1980s offers an individual a multitude of opportunities and challenges. In spite of routine entry into environments where the potential for panic and confusion prevails, the job of the fire fighter remains one of the most rewarding in the field of public service. New technology in building construction that allows for buildings of great height with increased fire load creates challenges to the fire service which were unthought of in the 1930s and 40s. Yet this same technology has given fire service personnel improved fire fighting equipment, dependable breathing apparatus, and lighter weight, more serviceable protective clothing to combat the scourge of fire. The changes technology has brought to the fire protection field have made it imperative that all persons functioning in the fire service be fully qualified and capable of efficiently performing the wide range of services necessary to protect life and property from fire.

The fire service has many unique management needs. It requires a distinct team spirit. It has a need for a strong disciplinary influence for concerted and instant reaction on the fireground. It requires a high quality of leadership from its officers. It has a continuing training demand. It requires a wide range of technical competence and the ability to deal with the public in both minor and major crisis situations.

Fire Fighter Standards

Many states have enacted legislation establishing commissions to create fire fighter standards. Such standards require that all personnel employed by the fire department must satisfactorily complete required basic training before being given permanent employment. Standards are usually expressed in measurable behavioral objectives covering both required knowledge and demonstrated skills. These standards are prepared by NFPA Technical Committees and cover entrance requirements, including medical examination, and three levels or grades of fire fighter qualifications known as Fire Fighter I, II, and III. The standards are used as a basis for nationally standardized examinations by authorized agencies and are available for adoption by federal, state, and local authorities in the United States.

Work Week

Fire fighters in some cities are on duty for 24 hours and then off for 48 hours. They receive an extra day off at intervals. In other cities they may work a 10-hour day shift for several days, a 14-hour night shift for several nights, and then have several days off. The actual hours on duty vary widely, however, and fire fighters often put in extra hours to bring fires under control. The work week may range from 40 hours a week in some cities to 56 hours a week in others.

Salaries

Salaries for fire fighters depend on the size of the city, its location, and the experience of the fire fighter. Beginning salaries range from $9,000 to $11,000 in many cities and towns to $17,000 or more a year in large cities such as New York, Los Angeles, and Chicago. Earnings for experienced fire fighters range from $17,000 to $23,000 a year. Many fire companies in rural regions consist of unpaid volunteer or partly paid fire fighters.

Most fire fighters receive allowances for dress uniforms. The departments provide helmets, boots and turn-out coats for fire fighting work. Fringe benefits vary with the location and size of the community. Liberal retirement pensions may enable fire fighters to retire at half pay at age 50. Most cities also pay injured fire fighters compensation equal to their regular pay.

Education

Educational requirements vary widely. Fire fighters in many communities must have a high school diploma or its equivalent to qualify for examinations for fire fighting. In many other places, however, applicants need not be high school graduates; in some cities, they must have a college degree. Many states have fire schools that offer courses in fire fighting and fire prevention. Community colleges offer fire protection technology programs, and some fire departments have formal apprenticeship programs.

Applicants for the job of fire fighter must be at least 18 years old, mentally alert, and healthy. They may need to meet height and weight requirements according to local regulations and may be required to be residents of the community in which they wish to work. More than 300,000 career fire fighters work in cities and towns across the country, and the U.S. Department of Labor predicts about 7,500 job openings a year through the 1980s. Budget cutting in many communities, however, may greatly reduce this number.

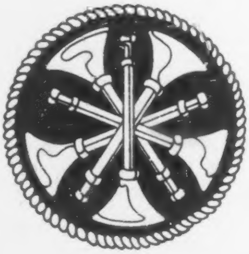
Related Fields

Allied careers in the fire protection field include those of fire protection engineers, industrial fire fighters, safety officers, and occupational health and safety (OSHA) inspectors and federal fire fighters. These positions require different educational requirements and experience than that of a public fire fighter and employment in these areas is usually in the private sector.

For more information about fire service careers, contact James McKiernan, Senior Fire Service Specialist, National Fire Protection Association, Batterymarch Park, Quincy, MA, 02269. Telephone: (617) 328-9290.

Fire Officers Rank and Insignia

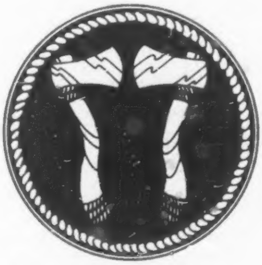
Fire Chief: the principal officer of a fire department.



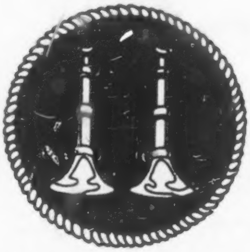
Chief

During the 1830s - 40s, fire fighters took great pride in the uniform they wore. Most fire fighters had two sets of uniforms — one for work and another for dress. Many wore elaborately decorated uniforms with brass shields and belt buckles with the company name and insignia. Others wore capes and trousers to match their fire engines.

Captain: the officer in charge of a company or fire station, or any other position of comparable responsibility. Frequently the highest ranking member of an individual company.

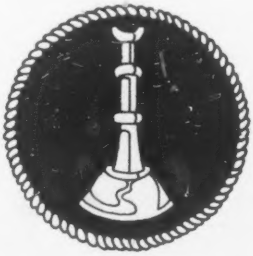


Captain — Truck Company

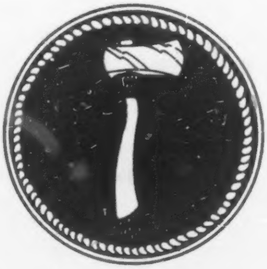


Captain — Engine Company

Lieutenant: the first officer of a fire company, in full command when the captain is absent and usually in command of one company.



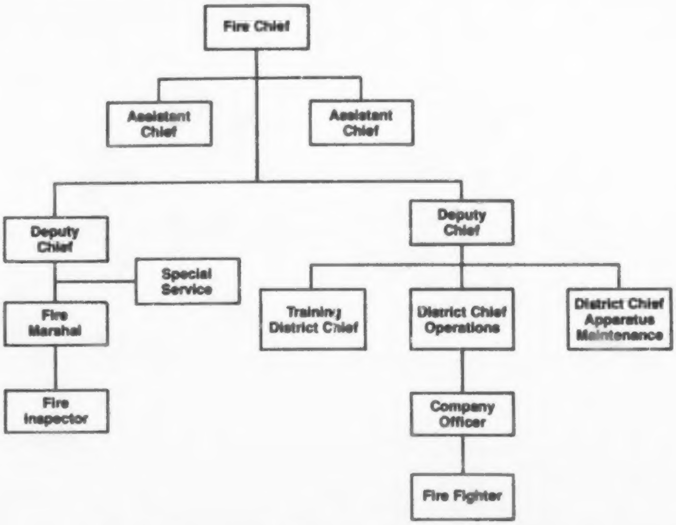
Lieutenant — Truck Company



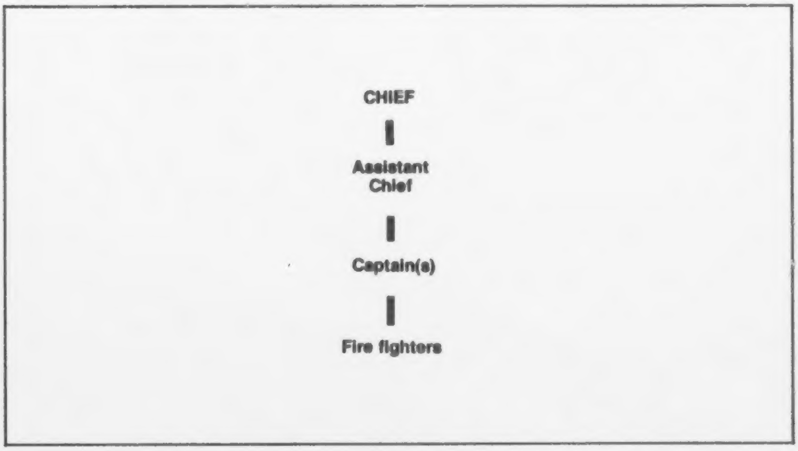
Lieutenant — Engine Company

WE WANT TO KNOW . . .
if a name, an address, or a phone number has changed; if there's an upcoming event, a new program or course, a new publication being offered. If you have more current information than is contained in this *Almanac*, know something that should be included in this book, or just have something interesting about the fire protection scene that you want to contribute, please let us know. Write: Editor, *Fire Almanac*, NFPA, Batterymarch Park, Quincy, MA 02269. All suggestions will receive our careful attention.

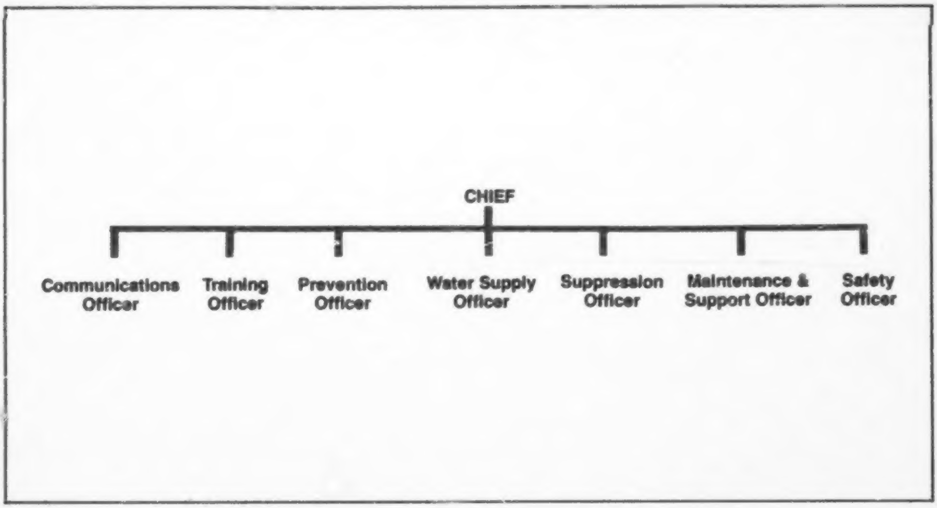
How Fire Departments are Organized


Fire Chief
Assistant Chief
Assistant Chief
Deputy Chief
Deputy Chief
Special Service
Fire Marshal
Fire Inspector
Training District Chief
District Chief Operations
District Chief Apparatus Maintenance
Company Officer
Fire Fighter

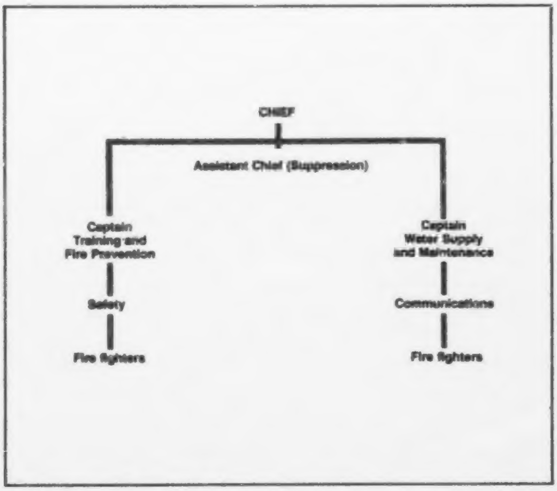
Typical organization plan for a full-time paid force.


CHIEF
Assistant Chief
Captain(s)
Fire fighters

Organization chart for a new, small department.


CHIEF
Communications Officer
Training Officer
Prevention Officer
Water Supply Officer
Suppression Officer
Maintenance & Support Officer
Safety Officer

Organization chart for a large suburban or rural department.


CHIEF
Assistant Chief (Suppression)
Captain Training and Fire Prevention
Safety
Fire fighters
Captain Water Supply and Maintenance
Communications
Fire fighters

Organization chart for the complete chain of command and staffing of a new department.

National Professional Qualifications System for the Fire Service

An important step in establishing national standards of professional competence for the fire service was taken by the Joint Council of National Fire Service Organizations (Joint Council) on October 25, 1972. The Council decided that one area of common interest where national collective action was desirable was the establishment of standards upon which the levels of competency within the fire service could be determined. The National Professional Qualifications System was established to accredit state certification programs, certify personnel, and register certified personnel on a national level. The following system is now fully operational and functioning in accordance with the directions of the Council:

1. Committees to develop standards of professional competency, made up of peer group representation; and
2. An independent Board to oversee and validate standards developed. Implementation of such standards in a nationally coordinated continuing professional development program for the fire service.

The Secretariat for Committees and Board is provided by the staff of the National Fire Protection Association.

There are four committees made up of representatives from the organizations comprising the Joint Council, in addition to certain other persons nominated by the Joint Council collectively. These four committees are responsible for recommended minimum standards of professional competence required of:

Fire Fighters (Levels I, II, III)
Fire Inspectors and Investigators (Levels I, II, III)
Fire Service Instructors (Levels I, II, III, IV)
Fire Service Officers (Levels I, II, III, IV, V, VI).

Each committee is established and operates under NFPA standards-making procedures, with one important variation. No draft standard shall be submitted to NFPA for final adoption until it has been approved by the National Professional Qualifications Board for the Fire Service.

Standards are prepared for use after final adoption as a basis for nationally standardized examinations by authorized agencies. The standards are available for adoption by federal, state and local authorities. The National Professional Qualifications Standards are also widely used by states, individual cities, and communities as a basis for the design of training and education programs. Using them will help the system to grow.

Performance Objectives

The Board directed all committees to develop standards in terms of terminal performance objectives. These objectives are considered the *minimum* necessary level of competency for a person to qualify at the respective level and in the role specified by the standard, no matter where that person is serving.

Throughout the standards, levels of numerical ascending sequence have been used to denote increasing degrees of responsibility. For example, the lowest or basic level for Fire Fighter I, II, III is I. A similar sequence is used in each standard; the total number of levels varies in accordance with the number of steps involved in the individual standard. Rank titles were not used due to variations among US fire departments.

The Standards

The standards are designed so that they can be achieved in a variety of ways, including participation in state and local training programs, self-study, attendance at colleges offering suitable courses, or in combinations of these ways.

The official standards are:
NFPA 1001: Fire Fighter Qualifications
NFPA 1002: Apparatus Driver/Operator
NFPA 1003: Airport Fire Fighter
NFPA 1021: Fire Officer - (Levels I through VI)
NFPA 1031: Fire Inspector/Investigator/Prevention Education Officer
NFPA 1041: Fire Service Instructor

The standards are only the first step. A controlled testing procedure that can be used to officially certify personnel when they have demonstrated their competency is also necessary. The Board reviews the validity and quality of testing procedures established by state and local authorities, and accredits such procedures.

National Certification of Fire Service Personnel
Accreditation of State Agencies

The accreditation program under the National Professional Qualifications System provides a means of uniform recognition of achievement of qualifications to the levels of competency specified in the standards. Therefore, the National Professional Qualifications Board for the Fire Service will accredit under the system any state that applies for accreditation and agrees to meet the criteria specified. In states where there is no agency with statutory authority to certify fire service personnel, a group or organization representing all fire service interests can apply, provided there is no statutory restriction on certification within that state.

The accreditation of state groups provides a means of integration rather than duplicating the certification process. It also provides for national recognition of both the state system and the achievements of individuals. Entry by a state agency or group is voluntary and the authority of the state is in no way diminished. The Joint Council and the Board decided on this method initially. Throughout the developmental stages, this decision has proven to be the best way to deal with an issue of personal concern to individuals in the fire service. The program is not competitive with any state system of certification and allows for the recognition of professional achievements by members of the public fire services.

A state agency that wishes to be accredited will be expected to meet certain criteria designed to ensure integrity, validity, fairness, and uniformity in the testing and assessment of the state certification system. The agency should be prepared to accept a limited degree of supervision by the National Professional Qualifications Board in this regard.

The state agency is asked to make a commitment to follow the criteria and agree to provide the Board with details about the state system. Next, the Board team will visit the state to review the state process and witness typical testing and assessment procedures. If the Board finds that the state system meets the criteria, accreditation will be given to the state. Then, when the state awards a state certificate to a qualified person, it will state that the person is qualified under the National System. Provision has also been made for a separate national certificate to be issued by the Board to persons certified under the system. This is an option that may be exercised either by the state agency or by an individual. A charge of $10.00 is made for issuance of a national certificate. Otherwise, the only cost for accreditation to a state agency or statewide organization is the expense of visits by the Board's accreditation team, usually two persons.

Although the criteria for accreditation is detailed, it is expected to be met in intent and objective by the accredited state agency. A pilot test conducted during 1979 and 1980 resulted in changes and amendments, enabling states with differing systems and methods to meet the objectives of accreditation.

Presently, the National Professional Qualifications Board can accredit only state level agencies or groups. Individual fire departments using the Professional Qualifications standards cannot be accredited. Where no state-provided certification system is available, the Board suggests that interested fire service personnel explore the possibility of establishing a voluntary state system.

Operation of System

Three states, Iowa, Oregon, and Oklahoma, were pilot-tested in 1979 and 1980. After adjustments both to their systems and the Board's criteria, the systems in these states were accredited. Approximately 3,000 persons have been certified by these states and are now registered with the National Professional Qualifications Board. Those certified persons who elect to receive a national certificate can apply for one; national certificates are now being issued.

In 1982, Virginia, Louisiana, and Georgia were visited by accreditation teams. Virginia was approved for accreditation, Louisiana was approved subject to some minor changes in their system, and Georgia was approved for accreditation under the system whenever the State Commission is ready to enter the system. Kansas applied in the latter part of 1982 and is being reviewed by the Board. Other states are preparing the documentation for accreditation and further applications are expected to be received on a continuing basis.

The US Air Force Institute at Chanute, IL, has been designated as the central establishment for certification of federal fire fighters, and is in the process of accreditation.

Several US Fire Academy courses are designed to meet objectives of the National Professional Qualifications Standards.

Inquiries have been received from countries outside the United States for possible accreditation under the US System. There have also been inquiries as to the potential for reciprocal arrangements between the US system and those already established in foreign countries. This issue will be placed under consideration by the Board and the Joint Council.

National Professional Qualifications Board

A nine-person Board is appointed by the Joint Council to act on behalf of the Council. The Board meets periodically as required to administer the system. Listed below are the Board's duties and responsibilities:

1. The Board is constituted to supervise a nationally coordinated continuing professional development program for the fire service.
2. It shall correlate, review and validate draft standards prepared by the Technical Committees established to produce professional standards for each level of fire service responsibility.
3. It shall approve all draft standards before such are submitted for final adoption procedures under the NFPA standards system.
4. It shall be responsible for the accreditation and supervision of any national programs of certification and shall coordinate with implementing agencies to ensure validity and reliability of the evaluation criteria used in connection with such programs.

Current Members of the Board

Allan R. Stone, Chief (Chairman, 1983)
Glendale Fire Department
633 E. Broadway, Suite 303
Glendale, CA 91205
(213) 956-4815

Martin E. Grimes (Secretary and Administrator)
Vice President
National Fire Protection Association
Batterymarch Park
Quincy, MA 02269
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David B. Gratz, Director
IAFC Foundation
9316 Brookville Rd.
Silver Spring, MD 20910
(301) 588-8791

Charles Hendricks, President
International Association of Black Professional Fire Fighters
5332 Kershaw St.
Philadelphia, PA 19131
(215) 477-1806

John W. Hoglund, Director
Fire and Rescue Institute
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College Park, MD 20740
(301) 454-2416

Frank E. Oberg
Associate Director
Fire Service Information,
Research & Information Center
University of Minnesota
3300 University Ave., SE
Minneapolis, MN 55414
(612) 376-3535

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Professional Fire Fighters of Arizona
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Phoenix, AZ 85020
(602) 997-1231

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Personnel Research Psychologist
Personnel Research & Development Center
Room 3226
Office of Personnel Management
1900 E St., NW
Washington, DC 20415
(202) 632-5428

Gary L. Thomas
Michigan State Firefighters Association
419 S. Washington Ave., Suite 104
Lansing, MI 48933

Further information about the system can be obtained from Martin Grimes, Administrative Secretary, National Professional Qualifications Board, Batterymarch Park, Quincy, MA 02269.

The Federal Fire Service

A majority of the material for this report was taken directly from the "Preliminary Report on the Protective Occupations Study—Part I (Fire Protection and Prevention Occupation)," June 1981, pp. 1-49, U. S. Office of Personnel Management, Compensation Group, Office of Compensation Program Development, 1900 E St., NW, Room 2416, Washington, DC 20415.

Employee Distribution by Agency

There are more than 23,000 federal government employees directly involved in fire engineering, fire suppression, fire prevention, or closely allied safety services at the federal level. Nearly 11,000 of these are civilian employees classified as Safety Specialists within the Fire Protection and Prevention Series, GS-081, for pay and compensation. Fire protection engineering professionals are classified within the GS-804 Series and others are within the GS-803 Series which includes Safety Engineers.

More than 7,700 employees are military personnel whose Military Occupational Specialties (MOS), ratings, or military job descriptions primarily involve the direct provision of firesafety services. Many of these employees provide base or installation fire protection services in both the United States and abroad.

In addition, there are consultants and other personnel not included here who may be hired on a temporary basis for specific activities. Also not included here are engineers, occupational safety and health specialists, or similar professionals who assist in the design, construction, maintenance, or operations of buildings, equipment, and facilities whose activities may indirectly have impact on fire protection conditions.

Tables 1 and 2 show the distribution of civilian federal fire fighters by department or independent agency.

During the 19th century, the public developed an enthusiastic interest in watching fires. Lillie Hitchcock Coit, a San Francisco socialite, was the most famous fire "buff" of the time. As a girl, she attended fires with the Knickerbocker Engine Company 5 with whom she became an honorary member. She wore a gold "5" pin until her death. The Coit memorial on Telegraph Hill in San Francisco is a 540-foot observation tower, shaped like a fire nozzle, that was constructed as requested by her with money she left to the city.

NUMBER OF GENERAL SCHEDULE FIRE FIGHTERS BY INDEPENDENT AGENCY

Agency	Total
Federal Emergency Management Agency	3
General Services Administration	73
National Aeronautics and Space Administration	25
Smithsonian Institute	4
Veterans Administration	508
Unspecified	61
TOTAL	674*

NUMBER OF GENERAL SCHEDULE FIRE FIGHTERS BY DEPARTMENT

Agency	Total
Agriculture	9
Commerce	18
Energy	137
HHS	35
Interior	59
Transportation	144
TOTAL	402*

*A majority of the material for this report was taken directly from the "Preliminary Report on the Protective Occupations Study — Part I (Fire Protection and Prevention Occupation)," June, 1981, pages 1-49, U.S. Office of Personnel Management, Compensation Group, Office of Compensation Program Development, 1900 E Street, N.W., Room 2416, Washington, DC 20415.

NUMBER OF MILITARY FIRE FIGHTERS BY DEPARTMENT

Department of Defense Agency	Total Fire Protection Personnel	GS-081	Fire Prot. Spec.	Military	Contract	Foreign Nationals
Department of Army	4,430	2,399	13	264	444	1,410
Department of Navy	5,884	4,413	38	845	37	551
Marine Corps	1,677	572	—	927	—	178
Air Force	9,632	3,221	30	5,666	—	715
Other	79	79	—	—	—	—
TOTALS**	21,702	10,605	81	7,702	481	2,854

**Derived from "Management Study of Fire Protection in the Department of Defense," 1981, Department of Defense.

Duties of Federal Fire Service Fire Fighters

Fire fighters in the federal service are employed at a variety of government installations that have wide variety of facilities, such as office and residential buildings; shops and manufacturing plants; ships and piers; fuel, chemical, and weapons storage areas; warehouses; brush and wooded areas; aircraft and airfield structures, etc. The current classification standard for the Fire Protection and Prevention Series, GS-081, defines this occupation as "positions that involve supervising or performing work in controlling and extinguishing fires; in rescuing persons endangered by fire; and in preventing fire by reducing or eliminating potential fire hazards." It also covers "... nonengineering work in developing and implementing fire protection and prevention plans, procedures, and standards. Positions in this occupation require a knowledge of firefighting and fire prevention theory and techniques; a knowledge of the operation of fixed and mobile firefighting equipment; and/or the ability to plan and direct fire protection and prevention programs and operations."

The specific duties common to most, if not all, federal fire fighters include the following:

Fire Fighter

- Unreels, lays out, operates, and directs hose lines discharging water or other fire suppressing agents.
- Enters structures to locate and extinguish seat of fire. Climbs ladders carrying heavy hoses or portable extinguishers. Makes forced entries by prying open or breaking doors, windows, etc.
- Makes forced entry into burning or damaged aircraft and ships to rescue passengers and crew and to extinguish the fire. Uses hand and power tools as necessary. Heavy physical exertion is required as well as speed and agility.
- Ventilates burning structures by opening doors and windows, or other existing openings. Sometimes cuts new openings in roofs and walls.
- Performs rescue operations including climbing ladders, forcible entry, moving obstructions, and moving through hot, smoke-filled structures to locate and assist or carry victims out of the danger areas.
- Performs salvage and overhaul operations.
- Maintains equipment.
- Attends daily drill and/or training sessions.
- Makes fire prevention inspections for routine fire hazards such as rubbish accumulations, improper use of common flammable liquids, blocked or broken fire exits and panic hardware, and frayed or misused electrical cords. May make routine checks and tests (e.g., flow tests) and perform minor maintenance (e.g., replace sprinkler heads, recharge extinguishers, etc.).
- In addition to these general duties, fire fighters at specific installations often have specialized duties and require special knowledges peculiar to that installation. These duties and knowledges may relate to the presence of nuclear, biological, or chemical agents; unique or experimental explosives or flammable materials; patients (general medical and/or psychiatric) in a hospital; or other unusual conditions.
- Federal fire fighters also perform a variety of additional tasks that are only indirectly related, if at all, to the job of fighting and preventing fires. These include: providing emergency medical service, involving operating the ambulance at the facility and often requiring additional training of the fire fighters as Emergency Medical Technicians (EMT) or, on occasion, as paramedics; cleaning up or otherwise handling fuel and chemical spills and other "accidents" involving toxic, biological, and/or radioactive materials; maintaining aircraft barriers; removing passengers from stalled elevators; and performing miscellaneous maintenance functions when employees regularly assigned to perform them are not on duty; etc. Many of these functions are assigned to the fire department because they are on duty around the clock and/or they have the basic skills necessary to perform them.

Fire Fighter (Driver/Operator)

- Must know all the duties of the fire fighter.
- Drives and performs light maintenance on mobile fire fighting equipment. Must be able to drive safely; know the best routes, including alternates, to fire locations; place truck in proper position to fight particular kinds of fires under varying conditions; know how to operate the equipment, such as pumps, turrets, etc.; and possess a knowledge of basic hydraulics to determine amount of pressure to pump according to the number and size of lines being serviced and to take full advantage of the amount of water available.
- Normally takes charge of the crew in the absence of a regularly assigned crew chief.

Fire Inspector

Fire inspectors prevent fires by physical inspection of facilities to detect and reduce or eliminate the hazards that cause fires. They also inspect new construction for inclusion of appropriate fire prevention materials and equipment. In addition, they participate in investigations of fires to determine the cause by inspecting damaged areas and interviewing witnesses. Fire inspection work requires a thorough knowledge of the applicable codes, regulations, practices and procedures; ability to recognize potential fire hazards and adapt or develop procedures for reducing or eliminating them; and tact and firmness in dealing with proper authorities to have corrective actions taken.

Fire Communications Operator

Fire communications operator positions are concerned with operating communications equipment such as telephones, telegraph, switchboards, radio, etc., to receive and transmit verbal or coded alarms and messages in connection with fire protection and prevention programs. In addition to the knowledge of communications equipment, these positions require a basic knowledge of fire fighting techniques; location, availability, and capability of fire fighting equipment; responsible officials to be notified in different kinds of fire emergencies; and other similar information required for the effective dispatching of employees and equipment.

Crew Chief

A crew chief is responsible for directing and participating in the work of the crew (i.e., two to eight fire fighters), and for one piece of motorized fire fighting equipment. Typically, the crew chief performs the following:

- Directs the crew in fire fighting activities, working from specific orders from higher level supervisors at the scene. In crash/rescue operations, frequently serves as prime rescuer.
- Directs and participates in practice drills and training classes for the assigned crew.
- Directs crew in fire protection inspection functions.
- Assigns crew members to station maintenance work, such as cleaning equipment, etc.
- Prepares reports for supervisor concerning fire runs, training, inspections, etc.
- In the absence of the supervisor, takes charge of all fire fighting activities at the scene of a fire.

Assistant Chief

Assistant Chiefs (sometimes called shift supervisors) are in immediate charge of fire fighting and fire prevention on an assigned shift. There are usually two or three assistant chief positions rather than, or at very large installations in addition to, one overall deputy, each of whom participates in the fire chief's administration, planning, and training activities only on the assigned shift. Because of the nature of shift operations, assistant chiefs are frequently the senior officers on duty, and are required to make decisions on administrative matters of a nonpolicy nature and in emergency situations, e.g., at the scene of a fire. When the fire chief is on duty (normally on the day shift), the shift supervisors serve as second-in-command, providing immediate direction of the operations of the department and carrying out the policies and instructions of the chief. The chief often consults shift supervisors for their views regarding all phases of the progam.

Fire Chief

Fire Chiefs are responsible for the overall management and supervision of the fire protection and fire prevention programs for a federal installation, including tenant activities and smaller installations under their jurisdiction. They develop, coordinate, and implement programs, policies, regulations, and procedures and serve as technical advisors to management on all matters pertaining to fire protection and prevention. They exercise full supervisory responsibility for a fire fighting and fire protection inspection force.

Work Schedules

Most federal fire fighters do not work an 8 hours per day, 40 hours per week schedule like most other employees. Rather, the great majority of federal fire fighters, primarily those in the Department of Defense (DOD), have tours of duty of 72 hours per week.

At the present time, it appears that the 72-hour workweek will remain in effect for some time to come, since the DOD with 90 percent of the federal fire fighters, has been consistently opposed to reducing the workweek to coincide with the predominant practice in the non-federal sector of 56 hours. The overriding concern of the DOD is the lack of additional slots in the manpower ceiling and the cost that would result if additional fire fighters had to be hired to maintain current levels of protection.

A much smaller number of federal fire fighters has tours of duty of 60 hours, 56 hours, 54 hours, and possibly other tours as well. Under these extended tours, fire fighters are on duty for 24 hours straight and then normally have at least one 24-hour period off.

The 24-hour tour of duty is comprised of three major categories of activities: (1) scheduled work; (2) stand-by, during which time the employees must remain at the fire station but are otherwise free to pursue whatever activities they desire, such as reading, TV, sports, physical fitness, etc.; and (3) sleeping. During the stand-by and sleep periods, the employee may be called on to perform work of an "emergency" nature. These emergencies may range from responding to a fire alarm, to providing first aid to a sick or injured person, to occasionally fixing a leak in the plumbing.

Pay Practices

According to current laws and regulations, a federal fire fighter is compensated for an extended tour of duty under two separate premium pay provisions. Under 5 U.S.C. 5545, a fire fighter receives premium pay on an annual basis because he is required "regularly to remain at, or within the confines of his station during longer than ordinary periods of duty, a substantial part of which consists of remaining in a stand-by status rather than performing work." This premium varies from 5 percent to 25 percent depending on the number of hours in the tour of duty, the number of hours actually required to work (as compared to being in a stand-by status), and the number of Sundays worked in the course of the year. Since most fire fighters have a 72-hour tour of duty including at least 40 Sundays, they receive the maximum of 25 percent as their annual premium. This annual premium is considered as part of base pay for retirement purposes. Until 1974, this comprised the total salary paid to federal fire fighters.

With the enactment of the Fair Labor Standards Act Amendments of 1974, which contained special provisions applicable to federal fire fighting and law enforcement personnel, federal fire fighters also became entitled to overtime payment, at the rate of 1½ times their hourly rate, for all hours over a specified amount, that number now being 54. (State and local governments are exempted from coverage of FLSA.) Numerous problems exist due to variations in the way overtime is computed, not only between agencies, but at different installations at the same agencies.

Comparison of Work Performed

Over the years, there have been long-standing discussions about whether the work performed by fire fighters in the Federal Government and in the municipal sector is equal or at least substantially equivalent. In an effort to resolve this question, a 1975 study compared protective occupations in the non-federal sector with their counterparts in the federal service. During that study, the project staff visited ten cities selected for their geographic location and population size. They interviewed personnel officials and fire department officials in each city.

The overall view of those persons interviewed was that individual fire fighters in municipal settings perform essentially the same duties as many of those in the federal sector. Fire officials also expressed the opinion that many federal installations have facilities and materials that are at least as difficult from a fire fighting standpoint as those of the average city. Many federal installations, particularly military bases (at which the great majority of federal fire fighters are employed — approximately 90 percent), have many kinds of unusual and highly hazardous facilities, equipment, and material, such as aircraft hangars, fuels, explosives, nuclear materials, tactical aircraft, chemical and biological agents, etc., in addition to the more conventional facilities, i.e., homes, office buildings, stores, banks, etc. The presence of these unusual facilities often imposes a requirement for more extensive knowledge and training than is typical of municipal fire fighters.

On the other hand, municipal fire fighters typically have a greater number and variety of actual fires to fight, do not often know in advance what kinds of hazards they will encounter, and because of these two factors, also face considerably more dangerous situations than do their federal counterparts. Based on an analysis of the specific nature of the fire fighting work performed, the potential for fire fighting problems, and the number and variety of hazardous conditions, the report concluded that the work of federal and non-federal fire fighters is, if not exactly the same, then at least reasonably equivalent and therefore comparable. The report did recognize the limitations in generalizing from a study based on a small sample of cities and the very limited fact-finding upon which that report was based.

There are also those who believe that the work of federal fire fighters is much less demanding and less hazardous than the typical non-federal fire fighter. The reason most often given for this is that federal fire fighters work in a much more controlled environment than municipal fire fighters. At a federal installation, fire inspections and pre-fire planning can result in a rather complete knowledge of what hazards exist and where those hazards are located. In addition, the fire chief can often ensure that hazards are corrected.

Conversely, municipal fire departments are restricted by privacy laws from conducting fire prevention inspections in private dwellings unless asked to do so by the resident. Even when hazards are found during voluntary inspections, municipal fire departments are often unable to require that correctable hazardous conditions be remedied. To a lesser extent, this is also true of private commercial and industrial facilities. Thus, the municipal fire fighter may well be subject to a greater risk of injury than the federal fire fighter simply because of the inability of municipal departments to control potential hazards and prevent fires from occurring.

While both municipal and federal fire fighters are trained to perform identical (or at least similar) duties, the relatively low incidence of large fires at federal installations means that federal fire fighters have less occasion to perform these duties than do their municipal counterparts. However, the number of actual fires encountered may not substantially affect the difficulty or value of the fire fighter's job. The level of training and skills required to deal with potential problems would seem to be one of the key issues in determining job value.

The job of the non-supervisory fire fighter, whether in municipal or federal employment, primarily involves a variety of specific knowledges and skills which can be learned and perfected through regular and recurring training and practice. Unlike the job of the police officer, which varies in difficulty according to the kinds of situations encountered and the nature of unassisted decisions made, fire fighters often have two or three levels of supervisors on-site who make decisions as to the methods and procedures that will be followed in handling most situations. These methods and procedures are constantly taught and drilled so that the fire fighter can carry them out from a brief instruction when faced with a specific situation. Thus, given the potential for equally difficult fire situations, the federal fire fighter learns and practices the knowledges and skills required to fight the many kinds of fires that may occur, but uses them primarily under simulated conditions, whereas his municipal counterpart uses the same knowledges and skills but more often in real fire situations. Therefore, within the job of controlling and extinguishing fires, there are counterbalancing characteristics to be considered. On one hand, the municipal fire fighter encounters a greater degree of hazard inherent in real fire situations as compared to simulated fires or practice drills encountered by federal fire fighters. On the other hand, because of the unique nature of the facilities and materials found on many federal installations, federal fire fighters must have a greater degree of knowledge and training in order to adequately and safely deal with those diverse and unusual fire situations, should they occur.

When comparing fire chiefs and the other higher level supervisory positions between the two sectors, there are differences. Municipal fire departments generally have more employees, operate more fire stations, and cover a larger area than is typical of federal installations. Consequently, city fire chiefs and subordinate managers must possess a significantly higher level of managerial and supervisory skills than their federal counterparts. Accordingly, they can command commensurately higher salaries.

The Federal Fire Service Task Group

The Federal Fire Service Task Group (FFSTG), a group of federal fire protection professionals, has been quietly revamping how various federal departments and agencies provide fire protection services. Using the tenets of modern fire protection and life safety principles, the "Task Group" has been instrumental in bringing about changes which have improved fire protection services to their agencies and protecting federal civilian employees, military personnel and their families and, most of all, the interests of the American taxpayer.

The Task Group, which normally meets in the Washington, DC area, represents the personnel of more than 829 federal or military-operated fire departments. Included in the Task Group are: federal fire service managers; fire protection specialists; chiefs; deputy chiefs and assistant chiefs of base and installation fire departments; fire protection program coordinators; and other individuals who direct fire protection; fire prevention, or life safety programs with most of the departments and agencies of the federal government.

During the last several years, the Task Group has been organized on an ad hoc basis under the auspices of the United States Fire Administration of the Federal Emergency Management Agency. On December 15, 1981, a charter was given to the Task Group by the USFA. A coordinator from the staff of the USFA was designated to interact between the FFSTG and provide the necessary administrative support. Bylaws for the group were adopted in February 1983.

Through their activities over the past several years, the participants of the Federal Fire Service Task Group have provided mutual encouragement, facilitated exchange, allowed coordination, and provided mutual assistance resulting in many of the progressive changes that have been taking place in federal fire protection. Many of their attempts have been aimed at avoiding the duplication of effort and providing for more efficient federal operations.

* * * * *

Women in the Fire Service

More and more today, fire departments are having to accomodate themselves to the entry of women in their ranks. This development often causes chiefs to ask: What anti-discrimination laws apply? Where can I find protective clothing to fit female recruits? How do I develop valid physical performance evaluations for women? How do I integrate women in training programs? What fire departments have been successful in hiring women?

This section contains information about laws, programs, protective clothing, and publications, and lists of people and organizations who have experience with the problems encountered with the entry of women into the fire service. The information has been excerpted from *Management of the Entry of Women in the Fire Service: A Management Directory*. The *Directory* contains a comprehensive list of programs and information, including examples (not reprinted here) that various departments have developed and used successfully. It was compiled by Carol Vougioukles of the International Association of Fire Fighters for the Federal Emergency Management Agency. The complete *Directory* is available through principal offices of your nearest IAFF local.

Career Fire Departments with Women

Career departments with women in fire suppression are listed in this section.

Alaska
Anchorage Fire Dept.
211 W. 7th St.
Anchorage 99501
(907) 264-4471

Arkansas
Little Rock Fire Dept.
P.O. Box 4081
Little Rock 72214
(501) 371-4796

Arizona
Phoenix Fire Dept.
1650 E. Dreamy Draw
Phoenix 85020
(602) 262-6002

California
Edwards AFB Fire Dept.
P.O. Box 518
Edwards 93523
(805) 277-4581

Milpitas Fire Dept.
455 E. Calaveras Blvd.
Milpitas 95035
(408) 942-2310

Oakland Fire Dept.
1330 Grove St.
Oakland 94612
(415) 444-3322

Orange City Fire Dept.
P.O. Box 6662
Orange 92667
(714) 538-5808

Rialto Fire Dept.
108 E. Rialto Ave.
Rialto 92376
(714) 875-3410

Sacramento Fire Dept.
3101 Stockton Blvd.
Sacramento 95820
(916) 449-5366

San Diego Fire Dept.
1222 First Ave.
San Diego 92101
(714) 236-5509

San Jose Fire Dept.
801 N. First St.
San Jose 95110
(408) 277-4251

Santa Barbara Fire Dept.
4410 Cathedral Oak Rd.
Santa Barbara 93110
(805) 964-6807

Santa Clara Fire Dept.
777 Denton St.
Santa Clara 95051
(408) 253-1165

Santa Maria City Fire Dept.
110 E. Cook St.
Santa Maria 93454
(805) 925-0951

Tulare Fire Dept.
800 S. Blackstone
Tulare 93274
(209) 688-2001

Colorado
Boulder Fire Dept.
P.O. Box 791
Boulder 80306
(303) 441-3351

Fort Collins Fire Dept.
505 Peterson St.
Fort Collins 80234
(303) 484-4220

West Adams Fire Dept.
10550 Huron St.
West Adams 80234
(303) 452-6024

Connecticut
Hartford Fire Dept.
275 Pearle St.
Hartford 06103
(203) 525-3123

State of Connecticut Fire Dept.
525 Main St.
Branford 06405
(203) 728-5138

Washington, DC
District of Columbia Fire Dept.
614 H. St., NW
Washington, DC 20001
(202) 754-2343

Washington National Airport Fire Dept.
Dulles International
Washington, DC 20041
(202) 557-7882

Florida
Boynton Beach Fire Dept.
P.O. Box 310
Boynton 33435
(305) 734-8116

Clearwater Fire Dept.
610 Franklin St.
Clearwater 33516
(813) 462-6300

Cocoa Fire Dept.
113 S. Fiske St.
Cocoa 32922
(305) 636-6667

Dayton Beach Fire Dept.
301 S. Beach St.
Dayton Beach 32014
(904) 255-1431

Dunedin Fire Dept.
P.O. Box BB
Dunedin 33528
(813) 736-3280

Fort Lauderdale Fire Dept.
301 N. Andrews Ave.
Fort Lauderdale 33302
(305) 458-2311

Hallandale Fire Dept.
121 S.W. Third St.
Hallandale 33009
(305) 458-2311

Jacksonville Fire Dept.
107 Market St.
Jacksonville 32202
(904) 633-5430

Maitland Fire Dept.
P.O. Box 66
Maitland 32751
(305) 644-8895

Margate Fire Dept.
600 Rock Island Rd.
Margate 33063
(305) 971-7010

Metro Dade Co. Fire Dept.
6000 S.W. 87th Ave.
Miami 33173
(305) 596-8600

Miami Fire Dept.
275 N.W. Second St.
Miami 33128
(305) 579-6300

Miami Beach Fire Dept.
2300 Pine Tree Dr.
Miami Beach 33140
(305) 673-7179

Miramar Fire Dept.
8909 Miramar Parkway
Miramar 33023
(305) 431-8200

Old Dixie Fire Dept.
6930 Barbour Rd.
West Palm Beach 33407
(305) 844-1444

Orlando Fire Dept.
P.O. Box 2846
Orlando 32802
(305) 849-2390

Palm Beach Fire Dept.
P.O. Box 2029
Palm Beach 33480
(305) 655-5347

Pembroke Pines Fire Dept.
9500 Pines Blvd.
Pembroke Pines 33024
(305) 431-2200

Pinellas Park Fire Dept.
5000 82nd Ave., N
Pinellas Park 33565
(813) 544-8834

Seminole Fire Dept.
11195 70th Ave.
Seminole 33542
(813) 393-7811

Tallahassee Fire Dept.
327 N. Adams St.
Tallahassee 32301
(904) 224-0712

Tampa Fire Dept.
808 Zack St.
Tampa 33602
(813) 223-8171

Trail Park Fire Dept.
3439 Lucerne Ave.
Lake Worth 33461
(305) 965-1872

Georgia

Atlanta Fire Dept.
46 Courtland St., SE
Atlanta 30335
(404) 658-6901

Cobb County Fire Dept.
P.O. Box 7237
Marietta 30065
(404) 427-5334

Douglasville Fire Dept.
6771 Church St.
Douglasville 30134
(404) 942-9942

Illinois

Chicago Fire Dept.
121 N. LaSalle, Room 105
Chicago 60602
(312) 744-4406

Des Plains Fire Dept.
405 Des Plains Ave.
Des Plains 60016
(312) 391-5340

Elk Grove Village Fire Dept.
101 Biesterfield Rd.
Elk Grove Village 60007
(312) 439-3902

Rockford Fire Dept.
204 S. First St.
Rockford 61104
(815) 987-5668

Waukeegan Fire Dept.
105 N. West St.
Waukeegan 60085
(312) 689-7503

Wheeling Fire Dept.
255 W. Dundee Rd.
Wheeling 60090
(312) 459-2662

Indiana

Fort Wayne Fire Dept.
One Main St., Room 350
Fort Wayne 46802
(219) 423-7011

Indianapolis Fire Dept.
555 N. New Jersey St.
Indianapolis 46204
(317) 923-2815

LaPorte Fire Dept.
809 W. 18th St.
LaPorte 46350
(219) 362-8317

Pike Township Fire Dept.
P.O. Box 68300
Pike Township 46268
(317) 299-0424

Washington Township Fire Dept.
2508 E. 71st St.
Washington Township 46220
(317) 251-6658

Iowa

Davenport Fire Dept.
331 Scott St.
Davenport 52801
(319) 326-7916

Kansas

Hutchinson Fire Dept.
18 E. B St.
Hutchinson 67501

Kentucky

Covington Fire Dept.
100 E. Robbins
Covington 41011
(606) 431-0462

Mayfield Fire Dept.
104 N. 6th
Mayfield 42066
(502) 247-1331

Louisiana

Baton Rouge Fire Dept.
2332 Florida Blvd.
Baton Rouge 70802
(504) 389-4660

Crowley Fire Dept.
P.O. Box 1712
Crowley 70526
(318) 783-2144

Kenner Fire Dept.
1801 Williams Blvd.
Kenner 70026
(504) 468-7241

Lawrence Fire Dept.
745 Vermont St.
Lawrence 66044
(913) 843-3322

Shreveport Fire Dept.
2701 Meadow St.
Shreveport 71108
(318) 635-6948

Maine
Lewiston Fire Dept.
2 College St.
Lewiston 04240
(207) 782-6247

Maryland
Anne Arundel County Fire Dept.
P.O. Box 276
Millersville 21108
(301) 987-4010

Baltimore County Fire Dept.
800 N. York Rd.
Towson 21204
(301) 494-4519

Montgomery County Fire Dept.
101 Maria St.
Rockville 20850
(301) 251-2444

Prince Georges County Fire Dept.
Room 2132, County Admn. Bldg.
Upper Marlboro 20870
(301) 952-4728

Massachusetts
Lexington Fire Dept.
45 Bedford St.
Lexington 02173
(617) 862-0500

Nantucket Fire Dept.
Lower Pleasant St.
Nantucket 02554
(617) 228-2324

Michigan
Ann Arbor Fire Dept.
111 N. Fifth Ave.
Ann Arbor 48104

Detroit Fire Dept.
250 W. Larned St.
Detroit 48226
(313) 224-2035

Minnesota
Columbia Heights Fire Dept.
555 Mill St, NW
Columbia Heights 55421
(612) 788-9221

Mississippi
Jackson Fire Dept.
555 S. West St.
Jackson 39201
(601) 960-1392

Missouri
Columbia Fire Dept.
P.O. Box N
Columbia 65205
(314) 874-7391

Independence Fire Dept.
103 N. Main St.
Independence 64050
(816) 836-8300

Kansas City Fire Dept.
414 E. 22nd St.
Kansas City 64108
(816) 471-1818

Lee's Summit Fire Dept.
207 S. Douglas St.
Lee's Summit 64063
(816) 251-2343

St. Charles City Fire Dept.
200 N. Second St.
St. Charles 63301
(314) 925-2000

New Jersey
Newark Fire Dept.
1010 18th Ave.
Newark 07106
(201) 733-7426

New Mexico
Albuquerque Fire Dept.
P.O. Box 258
Albuquerque 87103
(505) 766-7884

Bernalilo County Fire Dept.
1120 Coors Rd., SW
Coors 87195
(505) 766-4205

Farmington Fire Dept.
301 N. Auburn St.
Farmington 87401-5894
(505) 327-6351

Las Cruces Fire Dept.
P.O. Drawer CLC
Las Cruces 88004
(505) 526-0270

New York

Buffalo Fire Dept.
2401 City Hall
Buffalo 14213
(716) 856-4200

North Carolina

Charlotte Fire Dept.
125 S. Davidson St.
Charlotte 28205
(704) 374-2130

Raleigh Fire Dept.
220 S. Dawson St.
Raleigh 77601
(919) 755-6360

Southern Pines Fire Dept.
Morganton Rd.
Southern Pines 28387
(919) 692-2720

Ohio

Columbus Fire Dept.
555 E. Rich St.
Columbus 43215
(614) 221-3132

Granville Fire Dept.
P.O. Box 202
Granville 43023
(614) 587-0261

Miamisburg Fire Dept.
10 N. First St.
Miamisburg 45342
(513) 866-3303

Newark Fire Dept.
40 W. Main St.
Newark 43055
(614) 345-6075

Ottawa Hills Fire Dept.
2125 Richardo Rd.
Ottawa Hills 43606
(419) 531-4211

Randolph Township Fire Dept.
6996 Taywood Rd.
Englewood 45322

Oklahoma

Edmond Fire Dept.
925 E. 2nd St.
Edmond 73034

Norman Fire Dept.
411 E. Main St.
Norman 73071
(405) 321-8696

Oregon

Albany Fire Dept.
110 E. 6th Ave.
Albany 97321
(503) 967-4340

Corvallis Fire Dept.
P.O. Box 1083
Corvallis 97339
(503) 757-6901

Cottage Grove Fire Dept.
233 Harrison St.
Cottage Grove 97424
(503) 942-4493

Pennsylvania

Letterkenny Army Depot Fire Dept.
Chambersburg 17201
(717) 264-1411

McKeesport Fire Dept.
201 Lysle Blvd.
McKeesport 15132
(412) 675-5021

Pittsburgh Fire Dept.
100 Grant St.
Pittsburgh 15219
(412) 255-2860

Reading Bureau of Fire
8th & Washington Sts.
Reading 19601
(215) 376-4277

Rhode Island

Barrington Fire Dept.
R3 Rumstick Rd.
Barrington 02806
(401) 245-3108

Tennessee

Johnson City Fire Dept.
515 E. Main St.
Johnson City 37601
(615) 282-6323

Nashville Fire Dept.
500 2nd Ave., N.
Nashville 37201
(615) 259-5423

Texas

Abilene Fire Dept.
140 Mulberry St.
Abilene 79601
(915) 676-6413

Austin Fire Dept.
P.O. Box 1088
Austin 78767
(512) 443-9403

Baytown Fire Dept.
307 S. Main
Baytown 77520
(713) 424-7414

College Station Fire Dept.
P.O. Box 9960
College Station 77840
(713) 696-8280

Corpus Christi Fire Dept.
1401 Morgan St.
Corpus Christi 78404
(512) 884-8854

Dallas Fire Dept.
1500 Marilla
Dallas 75201
(214) 670-4615

Denton Fire Dept.
217 W. McKenney
Denton 76201
(817) 566-8149

Forest Hills Fire Dept.
P.O. Box 15330
Fort Worth 76119
(817) 531-1043

Galveston Fire Dept.
2514 Sealy Ave.
Galveston 77550
(713) 766-2145

Houston Fire Dept.
410 Bagby
Houston 77002
(713) 222-3964

Hurst Fire Dept.
2100 Precinct Line Rd.
Hurst 76053
(817) 634-3131

Killen Fire Dept.
201 N. 28th St.
Killen 76541
(817) 634-3131

Laredo Fire Dept.
One Guadelupe
Laredo 78040
(512) 722-7504

Port Authur Fire Dept.
P.O. Box 1089
Port Arthur 77640
(713) 985-5591

Texas City Fire Dept.
914 5th Ave., N
Texas City 77590
(713) 945-4468

Vermont

Hartford Fire Dept.
V.A. Cutoff Rd.
White River Junction 05001
(802) 295-3232

Virginia

Arlington County Fire Dept.
1020 N. Hudson St.
Arlington 22210
(703) 558-2901

Fairfax County Fire & Rescue
4031 University Dr.
Fairfax 22030
(703) 691-2126

Henrico Fire Dept.
P.O. Box 27032
Richmond 23273
(804) 541-2310

Norfolk Fire Dept.
540 E. City Hall Ave.
Norfolk 23510
(804) 441-2171

Petersburg Fire Dept.
3321 Johnson Rd.
Petersburg 23803
(804) 733-3951

Richmond Fire Dept.
501 N. 9th St.
Richmond 23219
(804) 427-4228

Virginia Beach Fire Dept.
Public Safety Bldg.
Virginia Beach 23456
(804) 427-4228

Henrico County Fire Dept.
Hungary Spring & Parham Rds.
Richmond 23229
(804) 747-4900

Washington

Bellevue Fire Dept.
P.O. Box 1768
Bellevue 98009
(206) 537-8530

Olympia Fire Dept.
108 W. State St.
Olympia 98501
(206) 753-8348

Parkland Fire Dept.
100 S. 114th
Tacoma 98444
(206) 537-8530

Port of Seattle Fire Dept.
2400 S. 170th St.
Seattle 98158
(206) 433-5327

Seattle Fire Dept.
301 Second Ave., S
Seattle 98104
(206) 623-2748

Tacoma Fire Dept.
901 Fawcett Ave.
Tacoma 87402
(206) 593-4433

Wisconsin

Allouez Fire Dept.
135 Dauphin St.
Green Bay 54301
(414) 437-1783

Kenosha Professional Fire Fighters
1625 Sherman Rd., #5
Kenosha 53104
(414) 551-8118

Madison Fire Dept.
1602 S. Park St.
Madison 53715
(608) 266-4428

Wausau Fire Dept.
Grand Ave. and Thomas St.
Wausau 55401
(715) 756-6244

Source: *Management of the Entry of Women in the Fire Service: A Directory of Resources*, FEMA, 1982.

Recruiting Programs for Women

Fire departments with programs for recruiting qualified women are listed alphabetically in this section. Undoubtedly, a well-planned and well-executed recruitment program will produce the best qualified women for selection. The United States Fire Administration has made available (through FEMA) *Managing the Entry of Women and Minorities*, a personnel management handbook on the legal issues associated with recruiting, hiring, and training women fire fighters. The manual contains in-depth guidelines about the process and techniques of an effective recruiting campaign.

Departments with Recruiting Programs

Arizona

Phoenix Fire Dept.
2430 S. 22nd Ave.
Phoenix 85009
(602) 262-6393

California

Fountain Valley Fire Dept.
10200 Alater Ave.
Fountain Valley 92708
(714) 963-8321

Inglewood Fire Dept.
1 Manchester Blvd.
Inglewood 90301
(213) 649-7350

Palo Alto Fire Dept.
250 Hamilton
Palo Alto 94305
(514) 329-2102

Sacramento Fire Dept.
3101 Stockton Blvd.
Sacramento 95820
(916) 449-5366

San Diego Fire Dept.
1222 First Ave.
San Diego 92101
(714) 236-5509

Santa Ana Fire Dept.
1439 S. Broadway
Santa Ana 92701
(714) 834-4112

Watsonville Fire Dept.
105 2nd St.
Watsonville 95076
(408) 728-6060

Connecticut
New Haven Fire Dept.
952 Grand Ave.
New Haven 06511
(203) 787-6300

Willimantic Fire Dept.
13 Bank St.
Willimantic 06226
(203) 423-2642

Washington, DC
District of Columbia Fire Dept.
438 Massachusetts Ave., NW
Washington, DC 20001
(202) 745-2347

Florida
Jacksonville Fire Dept.
107 Market St.
Jacksonville 32202
(904) 633-5430

Miami Beach Fire Dept.
2300 Pine Tree Dr.
Miami Beach 33149
(305) 673-7179

Seminole Fire Dept.
11195 70th Ave.
Seminole 33542

Georgia
Cobb County Fire Dept.
P.O. Box 7237
Marietta 30065
(404) 427-5334

Illinois
Evanston Fire Dept.
732 Madison
Evanston 60202
(312) 866-5900

Rockford Fire Dept.
204 S. First St.
Rockford 61104
(815) 987-5668

Indiana
Ft. Wayne Fire Dept.
1 Main St.
Ft. Wayne 46802
(219) 423-7011

Indianapolis Fire Dept.
555 N. New Jersey St.
Indianapolis 46204
(317) 923-2815

Maryland
Prince Georges Co. Fire Dept.
Room 2132, County Admn. Bldg.
Upper Marlboro 20870
(301) 952-4728

Michigan
Detroit Fire Dept.
250 W. Larned St.
Detroit 48226
(313) 224-2035

Missouri
Independence Fire Dept.
103 N. Main St.
Independence 64050
(314) 254-3211

Kansas City Fire Dept.
414 E. 22nd St.
Kansas City 64108
(816) 531-2121

New Jersey
Jersey City Fire Dept.
8 Erie St.
Jersey City 07302
(201) 547-4240

Newark Fire Dept.
1010 18th Ave.
Newark 07106
(201) 733-7426

New York
White Plains Fire Dept.
221 Mamaroneck Ave.
White Plains 10601
(914) 949-6303

North Carolina
Charlotte Fire Dept.
125 S. Davidson St.
Charlotte 28205
(704) 374-2130

Texas
Dallas Fire Dept.
1500 Marilla
Dallas 75201
(214) 670-4615

Virginia
Alexandria Fire Dept.
301 King St.
Alexandria 22314
(703) 750-6444

Arlington County Fire Dept.
1020 N. Hudson St.
Arlington 22201
(703) 558-2485

Washington
Port of Seattle Fire Dept.
2400 S. 170th St.
Seattle 98158
(206) 433-5327

Seattle Fire Dept.
301 Second Ave., S
Seattle 98104
(206) 623-2748

West Virginia
Huntington Fire Dept.
839 7th Ave.
Huntington 25701
(304) 696-5950

Wisconsin
Madison Fire Dept.
1602 S. Park St.
Madison 53715
(608) 266-4428

Milwaukee Fire Dept.
711 W. Wells St.
Milwaukee 53233
(414) 276-5656

Source: *Management of the Entry of Women in the Fire Service: A Directory of Resources*, FEMA, 1982. Data obtained from a series of national seminars and an IAFF assessment on women in the fire service.

THE DALLAS RECRUITMENT PROGRAM

Would your department like to increase the likelihood of recruiting women physically capable? The Dallas Fire Department did by stategically designing a recruiting program to seek out women who already possessed a high degree of physical fitness, thereby increasing the probability of successful completion of recruit training. Dallas recruiting officers target large educational institutions in various Texas cities and occasionally in other states. In their visits to these campuses, recruiters focus on physical education departments, nursing departments, and women's athletic teams, since these areas may yield a high percentage of women capable of learning and performing fire fighting skills. Today, Dallas employs 14 female fire fighters/paramedics in its fire department.

Physical Performance Testing

It is a proven fact that fire fighting requires above average levels of physical fitness. The strenuous nature of the job and the heavy liability assumed by the fire department in the financial protection of fire fighters demand strict screening of potential candidates for physical ability.

The physiological differences between male and female candidates, especially in muscular strength, mean that more women than men fail the physical performance evaluation during fire fighter selection. As a result of this situation, a physical performance evaluation that is valid and job-related is mandatory. Whether or not the candidate will successfully complete recruit school to become a competent rookie fire fighter should be the intent of the evaluation, and should be determined in the least discriminatory way. Therefore, a department's physical performance exam should be examined to ensure it is valid and job-related. Tests that are unquestionably based on the requirements of the job are also more likely to be upheld in court, should they be contested.

Experience has shown that, regarding the hiring of female fire fighters, standards should not be artificially raised or lowered. Rather, standards should be designed to realistically select the most-qualified candidates. Fire departments that have had experience designing and applying physical performance tests are listed in this section.

Departments with Experience in Designing Physical Performance Evaluations

Arizona
Phoenix Fire Dept.
2430 S. 22nd Ave.
Phoenix 85009
(602) 262-6393

Tucson Fire Dept.
P.O. Box 27210
Tucson 85726
(602) 791-4511

California
Fountain Valley Fire Dept.
19200 Slater Ave.
Fountain Valley 92708
(714) 963-8321

Sacramento Fire Dept.
3101 Stockton Blvd.
Sacramento 95820
(916) 449-5366

San Diego Fire Dept.
1222 First Ave.
San Diego 92101
(714) 236-5509

Santa Ana Fire Dept.
1439 S. Broadway
Santa Ana 92701
(714) 834-4112

Connecticut
Willimantic Fire Dept.
13 Bank St.
Willimantic 06226
(203) 423-2642

Florida
Miami Fire Dept.
P.O. Box 330708
Miami 33133
(305) 579-6300

Tampa Fire Dept.
808 Zack St.
Tampa 33602
(813) 223-8171

Illinois
Rockford Fire Dept.
204 S. First St.
Rockford 61104
(815) 987-5668

Indiana
Fort Wayne Fire Dept.
1 Main St.
Fort Wayne 46802
(219) 423-7011

Indianapolis Fire Dept.
555 N. New Jersey St.
Indianapolis 46204
(317) 923-2815

Pike Township Fire Dept.
P.O. Box 68300
Pike Township 46268
(317) 299-0424

Massachusetts
Lexington Fire Dept.
45 Bedford St.
Lexington 02173
(617) 862-0500

Maryland
Prince Georges Co. Fire Dept.
Room 2132, County Admn. Bldg.
Upper Marlboro 20870
(301) 952-4728

Michigan
Detroit Fire Dept.
250 W. Larned St.
Detroit 48226
(313) 224-2035

Missouri
Independence Fire Dept.
103 N. Main St.
Independence 64050
(314) 254-3211

New Jersey
Jersey City Fire Dept.
8 Erie St.
Jersey City 07302
(213) 547-4240

Ohio
Fostoria Fire Dept.
233 W. South St.
Fostoria 44830
(419) 435-3206

Oregon
Albany Fire Dept.
110 S.E. 6th Ave.
Albany 97321
(503) 967-4340

Texas
Dallas Fire Dept.
1500 Marilla
Dallas 75201
(214) 670-4615

El Paso Fire Dept.
600 E. Overland St.
El Paso 79901
(915) 532-2444

Virginia
Alexandria Fire Dept.
301 King St.
Alexandria 22314
(703) 750-6444

Arlington County Fire Dept.
1020 N. Hudson St.
Arlington 22210
(703) 558-2485

Fairfax County Fire Dept.
4031 University Dr.
Fairfax 22030
(703) 691-2126

Washington
Port of Seattle Fire Dept.
2400 S. 170th St.
Seattle 98158
(206) 433-5327

Seattle Fire Dept.
301 Second Ave. S
Seattle 98104
(206) 623-2748

Spokane Fire Dept.
W. 44 Riverside
Spokane 99207
(509) 456-2694

West Virginia
Huntington Fire Dept.
839 7th Ave.
Huntington 25701
(304) 696-5950

Wisconsin
Madison Fire Dept.
1602 S. Park St.
Madison 53715
(608) 266-4428

Source: *Management of the Entry of Women in the Fire Service: A Directory of Resources*, FEMA, 1982.

Recruit Training

One of the most critical steps in effectively managing the entry of women into the fire service is a department's first co-ed recruit training class. As in all phases of a department's affirmative action program, management's commitment to the entry of women is essential for the success of the recruit training program.

A fire department that has the following components is unlikely to have difficulties with the management of female recruits:

- A carefully planned training program.
- Commitment to affirmative action from the administration to the training personnel.
- Adequate and enforceable policies on discrimination (policies should be familiar to training personnel and thoroughly explained to recruits).
- Thorough documentation procedures. (It is impossible to over-document training activities that may be challenged.)

This section contains an alphabetical listing by state of fire departments where recruit training programs have contributed to the successful performance of women in the fire service. For further information on recruit training of female fire fighters, consult the manual *Managing the Entry of Women and Minorities* available from FEMA.

Departments with Experience in Training the Pre-training Programs Facilitating the Entry of Qualified Women

Arizona
Phoenix Fire Dept.
2430 S. 22nd Ave.
Phoenix 85009
(602) 262-6393

California
Oakland Fire Dept.
1330 Grove St.
Oakland 94612
(415) 444-3322, Ext. 22

San Diego Fire Dept.
1222 First Ave.
San Diego 92101
(714) 236-5509

Connecticut
Willimantic Fire Dept.
13 Bank St.
Willimantic 06226
(203) 423-2642

Illinois
Rockford Fire Dept.
204 S. First St.
Rockford 61104
(815) 987-5668

New Jersey
Jersey City Fire Dept.
8 Erie St.
Jersey City 07302
(201) 547-4240

New York
White Plains Fire Dept.
221 Mamaroneck Ave.
White Plains 10601
(914) 949-6303

Ohio
Fostoria Fire Dept.
233 W. South St.
Fostoria 44830
(419) 435-3206

Oklahoma
Oklahoma City Fire Dept.
820 N. West 5th St.
Oklahoma City 73112
(405) 947-0771

Oregon
Portland Fire Dept.
55 S.W. Ash
Portland 97204
(503) 248-4375

Texas
Dallas Fire Dept.
1500 Marilla
Dallas 75201
(214) 670-4615

Washington
Port of Seattle Fire Dept.
2400 S. 170th St.
Seattle 98158
(206) 433-5327

Seattle Fire Dept.
301 Second Ave. S
Seattle 98104
(206) 623-2748

Tacoma Fire Dept.
901 Fawcett Ave.
Tacoma 98402
(206) 593-4433

West Virginia
Huntington Fire Dept.
839 7th Ave.
Huntington 25701
(304) 696-5950

Source: *Management of the Entry of Women in the Fire Service: A Directory of Resources*, FEMA, 1982.

Protective Clothing

Fire departments are obligated to provide a safe and hazard-free work environment for personnel, wherever possible. To assist in the search for turnout gear that fits female fire fighters, a survey was conducted on the range of sizes for turnout pants and coats, gloves, safety shoes and boots. There is at least one manufacturer in each category that has a specialized line for women. In all cases, the buyer must determine if the specific product in question meets the appropriate standard for fire fighter protective clothing. The results of the survey are included in this section.

Major Anti-Discrimination Laws and Regulations

Presented here are brief summaries of 12 key anti-discrimination and equal employment opportunity laws, regulations, and other federal directives which may have a direct or indirect relationship to the recruitment, evaluation, hiring, training, and promotion of women fire fighters.

1. The Fourteenth Amendment. This amendment to the U.S. Constitution's Bill of Rights opened the way for the case-by-case civil rights efforts that culminated in the Civil Rights Act of 1964 and the EEO Act of 1972.

FIRE FIGHTER TURNOUT GEAR

Company	Range of Size		Proximity Suit	Chemical Suit	Custom Made
	Pants	Coats			
Alb, Inc. 366A Somerville Ave. Somerville, MA 02143 (617) 666-8126	26–48	32–56	NO	YES-Coat 32–56 + Overall	YES
Body-Guard by Survivair Div. U.S. Divers 3323 W. Warner Ave. Santa Ana, CA 92702 (714) 540-8010	26–56 24–36 long	34–58 34–48 long	NO	S/M/L/X	YES
Cairns and Brother/ Midwestern 60 Webro Rd. Clifton, NJ 07012 (201) 473-5867	EVERYTHING CUSTOM MADE TO ORDER				
Fyrepel Products, Inc. PO Box 518 Newark, OH 43055 (614) 344-0391	30–44 Also Fabric	34–56	YES	YES	YES
Globe Mfg. Co. Loudon Rd. Pittsfield, NH 03263 (603) 435-8323	EVERYTHING CUSTOM MADE TO ORDER				
Goodall Rubber Co. PO Box 8237 Trenton, NJ 08650 (609) 587-4000 (301) 525-1555	36–54	36–54	NO	YES All Sizes	YES
Janesville Apparel 2735 Kearns Ave. Dayton, OH 45414 (513) 278-5465	30–44	36–54	NO	NO	YES
Mine Safety Appliances Co. 600 Penn Center Blvd. Pittsburgh, PA 15235 (412) 273-2683	28–50	36–48	NO	Small 5′7″–6′3″	YES
Morning Pride Mfg. Co. 1985 Home Ave. Dayton, OH 45417 (513) 263-2683	EVERYTHING CUSTOM MADE TO ORDER				
Red Kap Industries 749 Massman Dr. Nashville, TN 37210 (615) 889-6800	28–46	Sm-XXL	NO	YES	YES (+ Charge)
Wheeler Protective Apparel, Inc. 1330 W. Belmont Ave. Chicago, IL 60641 (812) 685-5551	NO	NO	S–XL 38–50	38–50	Custom Make YES

Source: *Management of the Entry of Women in the Fire Service: A Directory of Resources*, FEMA, 1982.

GLOVES

Company	Range of Size
Cairns and Brother, Inc./Midwestern 60 Webro Rd. Clifton, NJ 07012 (201) 473–5867	Medium
Firecraft Div/Western Fire Equipment Co. P.O. Box 968E Wooster, OH 44691 (216) 264–6274	S, M, L, XL
Fyrepel Products, Inc. P.O. Box 518 Neward, OH 43055 (614) 344–0391	S, M, L
Globe Mfg. Co. Loudon Rd. Pittsfield, NH 03263 (603) 435–8323	Universal Large
Janesville Apparel 2735 Kearns Ave Dayton, OH 45414 (513) 278–5465	S, M, L Special order for XS and XL
Mine Safety Appliances Co. 600 Penn Center Blvd. Pittsburgh, PA 15235 (412) 273–5000	L
Morning Pride Mfg. Co. 1985 Home Ave. Dayton, OH 45417 (513) 263–2683	S, M, L, XL
Tempo Glove Mfg. Inc. 3820 West Wisconsin Ave. Milwaukee, WI 53206 (414) 344–1100	S (Women's) M, L, XL
Western Fire Equipment Co. 440 Valley Dr. Brisbane, CA 94005 (415) 467–5650	S, M, L, XL
Wolverine World Wide 9341 Courland Dr. Rockford, MI 49351 (616) 698–7220	X, M, L, X

Source: *Management of the Entry of Women in the Fire Service, A Directory of Resources*, FEMA, 1982.

FIRE FIGHTER SAFETY SHOES

Company	Range of Size		Custom Made
	Men	Women	
Hy-Test Safety Shoes Div. of Interco. Company PO Box 144885 St. Louis, MO 63178 (314) 342-7000	B8–12, 13 C7–12, 13 D6–12, 13 E6–12, 13 EEE6–12	N.A.	Custom
Lehigh Safety Shoe Co. Div. of Endicott-Johnson Prod. 1100 E. Main St. Endicott, NY 13760 (800) 847-9371	A, B9–12 C 8–12 D6–12, 13 E, EEE7–12, 13	A, AA, AAA5–11 B, C4–11 D, E5–11	Custom
Chippawaugh Shoe Co. Chippawaugh Falls, WI 54729 (715) 723-5571	C9–2, 13 D7–12, 13, 14 E7–12, 13 EE7–12, 13	N.A.	
Iron Age Shoe Co. 2406 Woodmere Dr. Pittsburgh, PA 15205 (412) 922-7005	AA4–15 A B C D E EEE	AA4–11 B E EE	

Source: *Management of the Entry of Women in the Fire Service, A Directory of Resources,* FEMA, 1982.

The Fourteenth Amendment provides that no state or local government shall deny any person equal protection of law or due process of law. It applies to all activities of all state and local governments — including their role as employers. In addition to other obligations that are, strictly speaking, outside the EEO sphere, it requires that state and local governments provide equal employment opportunity.

Unlike virtually every law designed to guarantee equal employment opportunity, the Fourteenth Amendment subjects to scrutiny *all* distinctions made among various employees or applicants for employment by a state or local government employer, to see if unconstitutional discrimination exists. This is in contrast to Title VII of the Civil Rights Act of 1964, which applies only to discrimination based on race, color, religion, sex, or national origin. The Fourteenth Amendment thus applies to kinds of employment discrimination not covered by Title VII. For example, it has been held by the courts to prohibit job discrimination because of homosexuality, alienage, and political beliefs.

The key difference between the Fourteenth Amendment and anti-discrimination laws like Title VII is that *intent to discriminate* is required for a violation of the Fourteenth Amendment. In its decision in *Washington* v *Davis*, the Supreme Court held that a city police department prehire test that had the effect of excluding a greater percentage of blacks than whites did not violate the Fourteenth Amendment because the city did not intend to discriminate against blacks.

2. Wagner-Peyser Act of 1933. This Act and its interpretative regulations prohibit discrimination on the basis of race, creed, color, or national origin. The regulations contain a policy statement promoting equal opportunity on the basis of sex. This Act applies to the operations of state employment services and unemployment insurance agencies.

FIRE FIGHTER BOOTS

Company	Range of Size	
	Men	Women
Fyrepel Products, Inc. P.O. Box 518 Newark, OH 43055 (614) 344–0391	5–14	N.A.
Goodall Rubber Co. P.O. Box 8237 Trenton, NJ 08650 (609) 587–4000	6–14	5–11
Ranger Rubber Company 1100 E. Main St. Endicott, NY 13760 (607) 757–4260	6–13 (M)	5–11
Servus Rubber Co. P.O. Box 36 Rock Island, IL 61201 (309) 786–7741	5–14	N.A.
Uniroyal, Inc. Benson Rd. Middlebury, CT 06749 (203) 573–3000	5–14 (M)	N.A.

Source: *Management of the Entry of Women in the Fire Service, A Directory of Resources,* FEMA, 1982.

3. The National Apprenticeship Act of 1937. This Act provides that apprenticeship programs registered with state agencies or the U.S. Department of Labor may not discriminate in the recruitment, selection, employment, and training of apprentices on the basis of race, color, religion, national origin, or sex.

4. The Civil Rights Act of 1957. This Act established the U.S. Commission on Civil Rights. It was amended in October 1972 to extend the Commission's jurisdiction to include sex discrimination, in addition to discrimination on the basis of race, religion, color, or national origin.

The function of the Commission is purely investigatory and fact-finding. It does not adjudicate and it cannot take any affirmative action which will affect an individual's legal rights. Its fact-finding results may be used as a basis for judicial, legislative, or executive action.

The Commission serves as a national clearinghouse for information regarding denials of equal protection of the laws on the basis of race, color, religion, sex, or national origin. As such, it publishes a wide variety of materials pertaining to the civil rights of minorities and women.

5. The Equal Pay Act (1963). This Act amended the Fair Labor Standards Act of 1938 (which established a federal minimum wage, overtime pay, and child labor laws) to include a prohibition against pay differentials based on sex. All businesses that must pay employees minimum wage are prohibited from discriminating on the basis of sex in determining wages for workers. *The Education Amendments of 1972* extend the Equal Pay Act to include previously uncovered executive, administrative, and professional workers (including academic personnel).

The Act forbids any employer who must pay employees at least minimum wage from determining wages for workers on the basis of sex. Exceptions are allowed if it can be shown that the wage differential is based on a seniority or merit system, a system measuring earnings by quantity or quality of production, or on any other factor other than sex.

To involve "equal work" under the Equal Pay Act, jobs need not be identical, but only substantially equal. Whether work is substantially equal is determined by comparing the skill, effort, and responsibility required in the jobs and the working conditions under which they are performed. Thus, job content and not job title is determinative. For example, job titles such as "clerk" or "stock clerk" are so general in nature and may include such a variety of different duties that different employees with the same title may nevertheless be found to be performing substantially unequal work under the Act. Conversely, jobs that are given different titles or different point values may be deemed equal under the statute.

A contractor must also review all benefits and conditions of employment to see that they are equally available without discrimination to all employees, male and female. This includes medical, hospital, accident and life insurance; retirement benefits; pension, profit-sharing and bonus plans; leave; and other terms, conditions, and privileges of employment.

6. Title VI of the Civil Rights Act of 1964. This Act has been broadly construed to prohibit employment discrimination. It expressly prohibits discrimination where the primary object of federal assistance is to provide employment. In addition, it has been construed by the courts to prohibit employment discrimination under other types of programs, because employment discrimination might disadvantage the intended beneficiaries of those programs. In net effect, then, Title VI applies to the employment practices of virtually every recipient of federal funds.

Title VI does not preempt other anti-discrimination laws. A state or local government employer subject to Title VI because it is receiving federal funding may also be subject to EEO requirements of the specific federal law under which the funds are received. In addition, it remains subject to the Fourteenth Amendment and other anti-discrimination laws such as the Civil Rights Acts and the Equal Pay Act.

Moreover, it has been held that the prohibition of discrimination contained in Title VI does not prevent the imposition of affirmative action requirements under other laws, orders, or regulations.

Title VI makes those federal agencies which distribute funds to state and local governments responsible for enforcing its nondiscrimination provision, and authorizes each agency to issue regulations to carry out this responsibility. These regulations apply only to federal assistance programs that have as their primary goal providing employment. However, as noted above, the courts have expanded Title VI to cover other programs where beneficiaries would be disadvantaged by employment discrimination, and these regulations might be extended to cover such situations.

7. Title VII Civil Rights Act of 1964. This Act specifically addresses itself to equal employment opportunity. Title VII prohibits discrimination in employment based on sex as well as race, color, religion, or national origin. The Act makes it unlawful to discriminate in hiring or firing; wages; fringe benefits; classifying, referring, assigning, or promoting employees; extending or assigning facilities, training, retraining, or apprenticeships; or any other terms, conditions, or privileges of employment. As amended in 1972, Title VII covers most employers of 15 or more employees, public and private employment agencies, labor unions with 15 or more members, and joint labor-management committees for apprenticeships and training. Indian tribes are exempt as employers. Religious institutions are exempt with respect to employing persons of a particular religion, but are covered with respect to discrimination based on sex, race, color, or national origin.

Originally, Title VII did not apply to state and local government employers. In 1972 it was amended to cover all such public employers having at least 15 workers for 20 or more calendar weeks per year. However, exempted from coverage are elected officials and their personal assistants and immediate advisors.

Title VII does permit employers to discriminate on the basis of religion, sex, or national origin (but not race or color) only if sex, religion, or national origin can be shown to be bona fide occupational qualifications. To be "bona fide," an occupational qualification must be necessary, not simply convenient, for the normal operation of the employer's business. This exception is rarely granted.

The Equal Employment Opportunity Commission (EEOC) will investigate where a complaint has been made or, on some occasions, where there are other indications that employment discrimination exists. After EEOC has found reasonable cause to believe that discrimination exists, the Commission informally attempts to bring the party for the discriminatory practices into compliance with Title VII.

The Commission, however, may order the employer to cease its discriminatory practices, to reinstate employees, to pay back wages, and to take other appropriate affirmative action to eliminate existing discrimination and prevent its recurrence.

8. Executive Order 11246 (1965). As amended, this order prohibits employment discrimination on the basis of race, color, religion, national origin, or sex in institutions or agencies with federal contracts of over 10,000. Relevant contracts include contracts for direct services and grants which involve a benefit to the federal government. Institutions or agencies covered under this Executive Order must observe non-discriminatory practices in hiring, discharge, promotion, wages, benefits, training, and all other conditions of employment.

Those institutions or agencies with federal contracts or grants of $50,000 or more and fifty or more employees are required to develop written affirmative action plans to overcome actively the effects of past discrimination, and to facilitate optimal utilization of qualified women and minorities throughout the work force. An affirmative action plan must contain a work force utilization analysis to identify those areas in which women and minorities are under-utilized, a review of all employment policies and practices to identify and to eliminate any sources of discrimination, and a statement of numerical goals and timetables for the correction of any identified under-utilization. Although the contract may involve only one unit within the institution, the affirmative action plan must cover all employees throughout the institution.

9. The Intergovernmental Personnel Act of 1970. This Act is designed to encourage the development of state and local government personnel merit systems, by requiring agencies or programs of state and local governments that receive grants-in-aid from a federal agency to develop and implement such systems.

State or local government units receiving funds covered by the Act are prohibited, by regulation, from discriminating on the basis of race, national origin, political, or religious affiliation or opinions, age, sex, physical disability, or any other characteristic which is unrelated to merit, unless it is a bona fide occupational qualification.

The United States Office of Personnel Management (formerly the Civil Service Commission) administers the Act. The OPM may recommend remedial action if the program fails to comply with the provisions under the Act, including termination of grants to state and local governments after they have been given reasonable notice and an opportunity for a hearing. However, actual enforcement authority rests with the grantor agency.

10. The Equal Employment Opportunity Act of 1972. This Act is an amendment to the Civil Rights Act of 1964 which adds sex and religion to the Title VII portion, and extends Equal Employment Opportunity (EEO) to state, local and municipal organizations, all employment agencies (private and public), and to labor organizations. This act empowers EEOC to bring civil action against any organization which is alleged to be practicing discrimination. The Act also gives individuals the right to take a complaint directly to a court of law.

11. The State and Local Fiscal Assistance Act of 1972. This Act provides funds to states, counties, townships, municipalities (and other local governments), Indian tribes, and Alaskan native villages for public safety, environmental protection, public transportation, health, recreation, libraries, social services for the poor or aged, financial administration, and other expenditures.

This Act, which is administered and enforced by the Director of the Office of Revenue Sharing, prohibits discrimination on the basis of race, color, national origin, sex, age, religion, or handicap in any program or activity receiving funds under the Act.

12. The Comprehensive Employment and Training Act of 1973. This Act establishes a decentralized system of federal, state, and local government programs to provide job training and employment opportunities for economically disadvantaged, unemployed, and underemployed persons. These programs may be sponsored by a state, a unit of local government, or an employment program serving a rural area with a high level of unemployment.

Any job training program that receives funds through this act may not discriminate on the basis of race, color, creed, national origin, sex, political affiliation, or beliefs. This prohibition also covers anyone who contracts or subcontracts with any funded program, as well as anyone who works with such a program by agreement.

If the Secretary of Labor determines that a recipient is discriminating, the Secretary must attempt to secure voluntary compliance. If this attempt is unsuccessful, the Secretary may terminate assistance, refer the matter to the United States Attorney General for institution of a civil suit, invoke the provisions of Title VI, or seek enforcement by other means. Moreover, a court has held that this law's EEO requirements may be enforced by a suit by a private individual.

Source: *Management of the Entry of Women in the Fire Service: A Directory of Resources*, FEMA, 1982.

Organizations and Agencies

AFL/CIO
815 16th St., NW
Washington, DC 20006
Cynthia McCaughan, Coordinator of Women's Activities
(202) 638-4024

Clearinghouse on Women's Issues
Dupont Circle Bldg., Suite 924
1346 Connecticut Ave., NW
Washington, DC 20036
(202) 466-3429

Coalition of Labor Union Women
15 Union Square
New York, NY 10003
Joyce D. Miller, President
(202) 242-0700

Defense Advisory Committee on Women in the Services (DACOWITS)
Room 3D322, Pentagon
Washington, DC 20301
Sally Richardson, Committee Chair
(202) 697-5655

Federal Emergency Management Agency
United States Fire Administration
Washington, DC 20472

Fire Fighter Safety, Health, and Technology
Andrew Sears, Director
(202) 634-7660

Office of Planning and Education
Women in the Fire Service Program
Laura Buchbinder
(202) 634-7553

International Association of Fire Fighters
1750 New York Ave., NW
Washington, DC 20006
(Information and services available only to Principal Officers of IAFF Affiliates.)

Research Department
Michael Smith, Director
(202) 872-8484

Health and Safety Program
Richard Duffy, Program Director
(202) 872-8484

Labor Recruitment Program
Roscoe Hamby, Program Director
(202) 783-4777

Women in the Fire Service Program
Carol Vougioukles, Program Director
(202) 872-8484

Michigan Municipal League
Firefighter Selection Research Project
1675 Green Rd., Box 1487
Ann Arbor, MI 48106
James L. Wardlow, Project Manager
(313) 662-3246

United States Department of Justice
Civil Rights Division
521 12th St., NW, Room 408
Washington, DC 20530
(202) 724-6758

United States Department of Labor
Office of the Secretary
Women's Bureau
200 Constitution Ave. NW
Room S 3005
Washington, DC 20210
(202) 523-9330

Women's Occupational Health Research Center
School of Public Health
Columbia University
60 Haven Ave. B-1
New York, NY 10032
Dr. Jeanne Stellman, Executive Director

Publications, Reports, Articles about Women in the Fire Service

Publications and Reports

International Association of Fire Fighters
1750 New York Ave., NW
Washington, DC 20006

Discrimination and the Firefighter, (Available only to Principal Officers of IAFF Affiliates) (p. 213)
Management of the Entry of Women in the Fire Service: A Directory of Resources

Federal Emergency Management Agency/U.S. Fire Administration
Washington, DC 20472

Development of Job-Related Physical Performance Examinations for Firefighters
The Role of Women in the Fire Service
Report: *Symposium on Women in the Fire Service*, September 8-10, 1980, Vancouver, WA
Report: *East Coast Conference on Women in the Fire Service*, December 10-12, 1980, Washington, DC
Manual: *Fire Department Personnel Management Handbook: Managing the Entry of Women and Minorities* (NTIS No. PB82227851)

Michigan Municipal League
Firefighter Selection Research Project
1675 Green Rd., Box 1487
Ann Arbor, MI 48106

Fire Fighter Selection Project Implementation Manual
Entry-Level Oral Examination
Job Analysis of the Entry-Level Firefighter Position (Vol. I)
Fire Fighter Physical Performance Test (Vol. II)
Firefighter Selection Interview Procedures (Vol. III)
Written Examination Development (Vol. IV)
Pre-employment Inquiries, Minimum Qualifications, Background Investigation (Vol. V)

Equal Employment Opportunity Commission
2401 E St., NW
Washington, DC 20506
(or see local telephone directory listing under U.S. Government)

A Directory of Resources for Affirmative Recruitment, (91 pages), 1975.
Guidelines on Discrimination Because of Sex, 1972.

U.S. Department of Commerce
Bureau of the Census
Washington, DC 20233

A Statistical Portrait of Women in the U.S., Special Studies, Series P-23 No. 58, (90 pages), 1976.
Women in Apprenticeship—Why Not?, R & D Monograph No. 33, (34 pages), 1976.

U.S. Department of Labor
Women's Bureau
Washington, DC 20210

Most Women Work Because of Economic Need, (chart), 1977.
Steps to Opening Skilled Traces to Women, (8 pages), 1974.
Trends in Women's Employment and Training in Selected Professions, (4 pages), 1976.
Women Workers Today, (10 pages), 1976.
A Working Woman's Guide to Her Job Rights, (34 pages), 1975, $.65.

CAREERS/JOB OPTIONS

Job Options for Women in the 80's, Pamphlet 18, (22 pages), 1980.
Women in Apprenticeship . . . There's a Future in It! Leaflet 58, Folder, 1980.
A Women's Guide to Apprenticeship, Pamphlet 17, (30 pages), 1980, 2.25.
Searching for a Job in the Construction Industry; Some Tips for Women, (5 pages), 1979.
Bibliography on Women in Apprenticeship, (1 page), 1979.
Women in Nontraditional Employment—A Selected List of Publications, Slides, and Films, (7 pages), 1979.
Sources of Assistance for Recruiting Women for Apprenticeship Programs and Skilled Nontraditional Blue-Collar Work, (6 pages), 1978.
Women in Nontraditional Jobs: A Program Model
Boston: *Nontraditional Occupations Program for Women*, (79 pages), 1978, $2.50.
Denver: *Better Jobs for Women*, (60 pages), 1978.
Women in Nontraditional Jobs: A Conference Guide—Increasing Job Options for Women, (32 pages), 1978, $1.60.

STANDARDS AND LEGISLATION AFFECTING WOMEN

Brief Highlights of Major Federal Laws on Sex Discrimination in Employment, (6 pages), 1980.
A Working Woman's Guide to Her Job Rights, Leaflet 55, 1979, $1.60.
Ban Against Pregnancy Discrimination, (2 pages), 1979.
New Regulations to Help Open Nontraditional Jobs to Women. Consumer Information Leaflet, (2 pages), 1978. (An explanation of the Department of Labor's new regulations on equal employment opportunity for minorities and women in the construction industry and in apprenticeship.)
State Labor Laws in Transition: From Protection to Equal Status for Women, Pamphlet 15, (20 pages), 1976, $.35. (Addendum through 1978 available from the Women's Bureau.)

Maternity Leave, Consumer Information Leaflet, (1 page), 1980.

Measures Providing Protection Against Sex Discrimination in Employment, Consumer Information Leaflet, (2 pages), 1980.

The Legal Status of Women. Reprint from *The Book of the States*, 1980-81. (11 pages). (Includes charts on marriage and divorce laws as of December 31, 1979.)

SLIDES

On a Typical Day . . . FEMA/USFA/OPE Washington, DC 20472. Shows variety of career options available for women in the fire service.

Destroying the Myths. EEOC Audio-Visual Division, Room 3200, Columbia Plaza, 2401 E St., NW, Washington, DC 20506 (202) 634-6930. Reviews employer equal opportunity responsibilities (10 minutes).

Order Section, National Audio-Visual Center (NAC)
General Services Administration
Washington, DC 20409

The Legal Rights of Women Workers. Expresses women's rights to equal employment opportunity, equal training and promotion opportunity, and equal pay. (NAC#-007847, 13, 6 minutes).

Legal Responsibilities—Affirmative Action and Equal Employment. Illustrates legal responsibilities of employers to eliminate unfair and illegal employment practices that often affect women. (NAC#-007848, $13.75, 12 minutes).

Articles

......."Women are Fire Fighters, too!", *Fire Command*, National Fire Protection Association, Boston, MA, Feb. 1976, pp. 16 - 19.

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Carlin, Phil, "Tucson's Physical Abilities Test for Firefighter Applicants," *Fire Chief*, H. Marvin Ginn, Chicago, IL, june, 1980, pp. 52-54.

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Lipkin, Harriet, "A Solution to Discrimination," *The International Fire Chief*, International Association of Fire Chiefs, Washington, DC, July, 1982, pp. 10-11.

Lipkin, Harriet, "Smoothing the Way for Women," *The International Fire Chief*, International Association of Fire Chiefs, Washington, DC, August, 1980, pp. 22-25.

Pantoga, Fritzie, "Women Firefighters - A Survey," *Fire Chief*, H. Marvin Ginn, Chicago, IL, January, 1977, pp. 51-54.

Quinn, Richard C., "First Woman Fire Fighter," *Fire Command*, National Fire Protection Association, Boston, MA, September, 1980, p. 29.

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Stabiner, Karen, "The Storm Over Women Firefighters," *The New York Times Magazine*, September 26, 1982, pp. 100-107.

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U.S. Forest Service Aviation Program

Scope

The Forest Service has the largest and one of the most varied aviation programs of any single U.S. Government agency except the three major military services. The total number of hours flown per year averages 100,000; about 75 percent fixed-wing and 25 percent helicopters. Most of the flying (about 65 percent) is in support of forest fire suppression and fire management programs.

A total aircraft fleet breakdown is approximately as follows:

Forest Service-owned	40
Forest Service-leased	25
Contract helicopter	115
Air tankers	48
Rental agreement light aircraft	250

Pilots and aviation managers employed by the Forest Service number about 105.

Complexity

Forest Service aviation operations include many types of missions:

- Fire detection patrols.
- Control of air tankers over fires (lead planes).
- Transportation of smokejumpers and paracargo in fixed-wing aircraft.
- Floatplane operations.
- Air tankers and helicopters dropping fire retardants.
- Transportation for Forest Service managerial technical and administrative personnel to remote locations in all weather conditions year-round.
- Land and wildlife management flights.
- Infrared sensing and mapping.
- Aerial photograph.
- Research and development flying in connection with new technology including night operation of helicopters using "Night Vision Goggles," aerial ignition devices, and rappelling of persons into inaccessable areas. Air tanker tank and gating systems are tested, and infrared scanning and FLIR usage is under research.

These flying missions often involve a high degree of hazard:

- Steep mountainous terrain.
- High density altitudes.
- Low-level operations in turbulent air and poor visibility due to smoke.
- Congested airspace.
- Short back-country "one chance" airstrips.
- All weather operations year-round.

Forest Service aviation activities utilize the following types of aircraft:

- All common and standard general aviation aircraft ranging from Cessna 150s, 172s, 180s, 182s, supercubs and similar single-engine types; through Cessna, Beechcraft, Piper, Aero Commander and other light twin-engine planes; to DeHavilland, Twin Otter and Beaver, Beechcraft 99 and 58P, Douglas DC-3, Convair and Lockheed Electra transports.
- Restricted, standard and military category 2-, 3-, and 4-engine air tankers, including Grumman S2F, Douglas B-26, DC-6, and DC-7; Lockheed P2V, PV-2 and C-130; Fairchild C-119; Boeing B-17; and Consolidated-Vultee PB4Y-2.
- Light, medium and heavy helicopters ranging from three-place Bell 47G, Hiller SL-4, and Hughes 300 types; through turbine Bell Jet Rangers B-212s, and Hughes 500s, Alouette IIs, IIIs, and Lama's and Sikorsky's S-58Ts and also the largest Sikorsky S-61s, S-64 Skycrane and Vertol 107s.
- Sophisticated fixed-wing all-weather airplanes including Beechcraft King Air and Queen Air and Swearingen Merlin III planes equipped with cameras and infrared mapping equipment.

Qualifications for Pilots

In order to be considered fully qualified to fly Forest Service missions, individuals must have the following qualifications and experience.

- Possess a current, valid FAA unrestricted commercial pilot certificate (instrument rating — fixed-wing pilots) and appropriate aircraft rating.
- Possess a current, valid FAA second class medical certificate. After the fortieth birthday, evidence of an EKG examination indicating absence of myocardial infarction is also required with each medical certificate.

Typical terrain experience requirement is: pilot experience in mountainous terrain with varying elevations of over 5000 feet pressure altitude at temperature ranges above 75°F, rugged peaks, deep canyons, cliffs, rock out-crops, steep slopes, mountaintop helispots, mountainside landing spots surrounded by trees, brush, or rocks; persistent wind, and weather which includes strong winds in the mountains and canyons with sudden up and down drafts and direction changes.

FLYING EXPERIENCE REQUIREMENTS

All Airplanes	Flying Hours
Total Time	1500
Pilot-in-Command Total	1200
Pilot-in-Command as follows:	
Category and class to be flown	200
Cross country	300
Operations in typical terrain (low level, mountainous, etc.)	200
Night	100
Instrument-actual/simulated	100
Make and model to be flown	25
Preceding 12 months	100
Preceding 60 days, all except air tanker	10
Heavy multi-engine fixed-wing (over 12,500 pounds weight)	
Multi-engine, pilot-in-command	250
In type, pilot-in-command, within past 5 years (Unrestricted FAA type rating for applicable airplane)	25
Helicopters	
Helicopter, pilot-in-command	1500
Weight class, light, medium, or heavy	100
Turbine or reciprocating engine, as applicable	100
Make, model, and subsequent series	50
Make and model in preceding 60 days	10
Make and model in preceding 30 days	5
Typical terrain	200

Pilots are hired from the Civil Service Register or from other government agencies. In order to meet standards of performance required, the Forest Service maintains a continuous training and upgrading program for its aviation personnel.

Future Outlook

There will be a continuing need for aircraft in support of fire suppression. This type of activity fluctuates according to severity of the fire season, but should average about the same number of hours. Administrative and project flying should increase at a small but steady rate.

The number of Forest Service-owned aircraft will remain static as old airplanes are excessed and new ones acquired. The pilot work force should remain about the same.

There will be more extensive use of contract aviation services, particularly "job" contracts such as helicopter logging, spraying and seeding.

The Forest Service will continue the policy of a high level of maintenance and upgrading aircraft, and adhering to standard skill and professionalism required for safety in our aviation operations.

* * * * *

Fire Protection/Fire Science Education

Colleges and universities that provide four-year degrees in the field of Fire Protection/Fire Science are listed below. The program at each school varies and may lead to an emphasis in fire protection engineering, fire technology. Fire science or fire administration and management students interested in any program should contact the schools directly to determine whether the course emphasis meets their career objectives.

The International Association of Fire Fighters administers a higher education program that provides opportunities for fire service personnel anywhere in the country to take upper level college courses for professional enrichment or as components of a baccalaureate degree. The program allows a student to enroll at a regional institution serving his/her state. All courses are in an independent study format that allows the student to study at home without mandatory classroom attendance. The Open Learning Courses cover the areas of fire administration and fire prevention technology.

The schools with an asterisk (*) after their name participate in the Open Learning Program. Further information can be obtained from:

Open Learning Fire Service Program
Dr. Betty Jo Mayeske
1750 New York Ave.
Washington, DC 20006
202-659-2067

Alabama
Troy State University
Troy

California
California State University
Department of Industrial Studies
5151 State University Dr.
Los Angeles 90032

Cogswell College*
600 Stockton St.
San Francisco 94108

Connecticut
University of New Haven
300 Orange Ave.
West Haven 06516

Washington, DC
University of District of Columbia
4200 Connecticut Ave. NW
Washington 20008

Florida
Florida International University*
Tamiami Campus
Miami 33199

Illinois
Illinois Institute of Technology
3300 Federal St.
Chicago 60616

Southern Illinois University
Carbondale Campus
Carbondale 62901

Western Illinois University*
Macomb 61455

Kansas
Wichita State University
Department of Industrial Engineering
Wichita 67203

Kentucky
Eastern Kentucky University
College of Law Enforcement
Richmond 40475

Maryland
University of Maryland*
College of Engineering
College Park 20472

Massachusettts
University of Massachusetts
Columbia Point
Boston 02125

Michigan
Madonna College
36600 School Craft Rd.
Livonia 48150

Minnesota
University of Minnesota*
77 Pleasant St. SE
Minneapolis 55455

Missouri
Central Missouri State University
School of Public Service
Warrensburg 64093

Mississippi
Jackson State University
Department of Industrial Technology
Jackson 39217

New Jersey
Jersey City State College
2039 Kennedy Blvd.
Jersey City 07305

New York
Empire State College*
State University of New York
2 Union Ave.
Saratoga Springs 12866

Mercy College
555 Broadway
Dobbs Ferry 10522

Ohio
University of Cincinnati
College of Applied Science
100 East Central Park
Cincinnati 45210

Oklahoma
Oklahoma State University
301 Campus Fire Station
Stillwater 74074

University of Oklahoma*
Suite 226
1700 Asp Ave.
Norman 73037

Oregon
Western Oregon State College*
Monmouth 97361

Pennsylvania
Holy Family College
Grant and Frankfort Ave.
Philadelphia 19114

Rhode Island
Providence College
Providence 02918

Tennessee
Memphis State University*
University College
Memphis 38152

Texas
Texas A&M University
School of Industrial Technology
College Station 77840

Virginia
George Mason University
4400 University Dr.
Fairfax 22030

The following colleges and universities offer programs in fire science/fire technology leading to a two-year degree. As with the four-year programs, no attempt has been made to define the specific emphasis of the programs between fire technology, fire science, or fire administration. Students should contact the schools directly to determine whether the course emphasis is in line with their career objectives.

Alabama
Alexander City State Junior College
Cherokee Rd.
Alexander City 35010

Chattahoochee Valley State Community College
119 Broad St.
Phoenix City 36967

George Corley Wallace State Community College
P.O. Drawer 1049
Selma 36701

Gadsden State Junior College
George Wallace Dr.
Gadsden 35903

Jefferson State Junior College
2601 Carson Rd.
Birmingham 35215

Alaska
Anchorage Community College
2533 Providence Ave.
Anchorage 99504

Juneau-Douglas Community College
Box 1447
Juneau 99802

Kenia Community College
Box 848
Soldothna 99669

Ketchikan Community College
7th and Madison St.
Ketchikan 99901

Tanana Valley Community College District
University of Alaska
Fairbanks 99701

Arizona

Arizona College of Technology
Route 97
Winkelman 85292

Arizona Western College
P.O. Box 929
Yuma 85364

Cochise College
Douglas 85607

Eastern Arizona College
616 Church St.
Thatcher 85552

Glendale Community College
6000 West Olive Ave.
Glendale 85302

Mesa Community College
1833 West Southern Ave.
Mesa 85202

Mohave Community College
1971 Jagerson Ave.
Kingman 86401

Northland Pioneer College
203 W. Hopi Dr.
Holbrook 86025

Phoenix College
1202 West Thomas Rd.
Phoenix 85013

Pima County Community College
2202 West Anklam Rd.
Tucson 85706

Pinal County Community College District
Woodruff at Overfield Rd.
Coolidge 85226

Scottsdale Community College
9000 E. Chaparral
Scottsdale 85251

Sierra Vista Campus
Sierra Vista 85655

Yavapai College
1100 East Sheldon St.
Prescott 86301

Arkansas

State Fire Training Programs
Southwest Technical Institute
P.O. Box 45
East Camden 71701

California

Allan Hancock College
800 S. College Dr.
Santa Maria 93454

American River College
4700 College Oak Dr.
Sacramento 95841

Bakersfield College
1801 Panorama Dr.
Bakersfield 93305

Barstow College
2700 Barstow Rd.
Barstow 92311

Butte Community College
P.O. Box 183A
Oroville 95965

Cabrillo College
6500 Soquel Dr.
Aptos 95003

Cerro Coso Community College
College Heights Blvd.
Ridgecrest 93555

Chabot College
25555 Hesperian Blvd.
Hayward, 94545

Chaffey Community College
5885 Haven Ave.
Alta Luma 91701

City College of San Francisco
50 Phelan Ave.
San Francisco 94127

Cogswell College
600 Stockton St.
San Francisco 94108

College of the Desert
43500 Monterey Ave.
Palm Desert 92260

College of the Redwoods
Redwood Center
Eureka 95501

College of San Mateo
1700 West Hillsdale Blvd.
San Mateo 94402

College of the Sequoias
915 South Mooney Blvd.
Visalia 93277

College of the Siskiyous
800 College Ave.
Weed 96094

Columbia Junior College
P.O. Box 1849
Columbia 95310

Cosumnes River College
8401 Center Parkway
Sacramento 95823

Cuesta Community College
P.O. Box J
San Luis Obispo 93406

Feather River College
P.O. Box 1110
Quincy 95971

Fresno City College
1101 East University Ave.
Fresno 93704

Glendale College
1500 North Verdugo Rd.
Glendale 91208

Grossmont Community College
8800 Grossmont College Dr.
El Cajon 92020

Hartnell College
156 Homestead Ave.
Salinas 93901

Humboldt State University
Arcata 95521

Lake Tahoe Community College
P.O. Box 14445
South Lake Tahoe 95702

Lassen College
P.O. Box 3000
Susanville 96130

Long Beach City College
4901 East Carson St.
Long Beach 90808

Los Angeles Harbor College
111 Figueroa Place
Wilmington 90744

Los Angeles Valley College
5300 Fulton Ave.
Van Nuys 91401

East Los Angeles College
5357 E. Brooklyn Ave.
Los Angeles 90022

Los Medanos College
2700 East Leland Rd.
Pittsburgh 94565

Marion Community College
Kentfield 94904

Mendocino Community College
P.O. Box 3000
Ukiah 95482

Merced College
3600 M St.
Merced 95340

Merritt College
12500 Campus Dr.
Oakland 94619

Miramar College
10440 Black Mountain Rd.
San Diego 92126

Mission Community College
3000 Mission College Blvd.
Santa Clara 95054

Modesto Junior College
P.O. Box 4065
College Ave.
Modesto 95352

Monterey Peninsula College
980 Fremont St.
Monterey 93940

Moorpark College
7075 Campus Rd.
Moorpark 93001

Mount San Antonio College
1100 North Grand Ave.
Walnut 91789

Mount San Jacinto College
21400 Highway 79
San Jacinto 92383

Napa College
2277 Napa Vallejo Highway
Napa 94558

Oxnard College
4000 South Rose Ave.
Oxnard 93030

Palomar Community College
1140 Mission Rd.
San Marcos 92069

Pasadena City College
1570 East Colorado Blvd.
Pasadena 91106

Rio Hondo College
3600 Workman Mill Rd.
Whittier 90603

Riverside City College
4300 Magnolia Ave.
Riverside 92506

San Bernadino Valley College
701 S. Mount Vernon St.
San Bernadino 92403

San Joaquin Delta College
5151 Pacific Ave.
Stockton 95207

San Jose City College
2100 Moorpark Ave.
San Jose 95128

Santa Ana College
17th and Bristol St.
Santa Ana 92706

Santa Barbara City College
721 Cliff Dr.
Santa Barbara 93109

Santa Monica Junior College
1815 Pearl St.
Santa Monica 90045

Santa Rosa Junior College
1501 Mendocino Ave.
Santa Rosa 95401

Shasta College
1065 N. Old Oregon Trail
Redding 96099

Solano County Junior College
P.O. Box 246
Suisun City 94585

Ventura College
4667 Telegraph Rd.
Ventura 93003

Victor Valley College
18422 Bear Balley Rd.
P.O. Drawer 00
Victorville 92392

Yuba Community College
2088 North Beale Rd.
Marysville 95901

Colorado

Aims Community College
P.O. Box 69
Greeley 80631

Community College of Denver
Red Rocks Campus
12600 W. 6th Ave.
Golden 80401

El Paso Community College
2200 Bott St.
Colorado Springs 80904

Pikes Peak Community College
5657 S. Academy Blvd.
Colorado Springs 80906

Trinidad State Junior College
Trinidad 81082

Connecticut

Hartford State Technical College
401 Flatbush Ave.
Hartford 06106

Greater New Haven State Technical College
71 Jones Rd.
Hamden 06514

Thames Valley State Technical College
547 New London Turnpike
Norwich 06360

Waterbury State Technical College
1460 West Main St.
Waterbury 06708

Delaware

Delaware Technical & Community College
Kent Campus
1679 South State St. Ext.
Dover 19901

Delaware Technical & Community College
Stanton Campus
P.O. Box 1260
Newark 19711

Washington, DC

University of District of Columbia
4200 Connecticut Ave., NW
20008

Southeastern University
501 I St., NW
20024

Florida

Brevard Community College
Clear Lake Rd.
Cocoa 32922

Broward Community College
3501 SW Davie Rd.
Fort Lauderdale 33314

Central Florida Community College
P.O. Box 1388
Ocala 32670

Edison Community College
College Parkway
Fort Meyers 33901

Florida Atlantic University
Administration 384
500 NW 20th St.
Boca Raton 33432

Florida Junior College at Jacksonville
21 West Church St.
Jacksonville 32216

Gulf Coast Community College
5230 West Highway 98
Panama City 32401

Hillsborough Community College
P.O. Box 22127
Tampa 33622

Indian River Community College
3209 Virginia Ave.
Fort Pierce 33450

Miami Dade Community College
11380 NW 27th Ave.
Miami 33167

Okallosa-Walton Junior College
College Blvd.
Niceville 32578

Palm Beach Junior College
4200 Congress Ave.
Lake Worth 33461

Polk Community College
999 Ave. H. NE
Winter Haven 33880

St. Petersburg Junior College
P.O. Box 13489
St. Petersburg 33733

Santa Fe Community College
P.O. Box 1530
Gainesville 32601

Seminole Community College
Highway 17-29
Stanford 32771

University of South Florida
4202 Fowler Ave.
Tampa 33620

Valencia Community College
P.O. Box 3028
Orlando 32802

Georgia

Albany Junior College
Gillionville Rd.
Albany 31707

Clayton Junior College
P.O. Box 235
5900 Lee St.
Morrow 30260

Dekalb Community College
955 North Indian Creek Rd.
Clarkston 30021

Gainesville Junior College
Gainesville 30501

Hawaii

Hawaii Community College
1400 Kapiolani St.
Hilo 96720

Honolulu Community College
874 Dillingham Blvd.
Honolulu 96817

Kauai Community College
3-1901 Kaumalii Highway
Lihue Kauai 96766

Idaho

Idaho State Trade and Technical School
Box 173
Idaho State University
Pocatello 83209

Illinois

Black Hawk College
3010 4th Ave.
Moline 61244

Carl Sandburg College
2232 South Lake Storey Rd.
Box 1407
Galesburg 61401

College of DuPage
Lambert Rd. and 22nd St.
Glen Ellyn 60137

College of Lake County
19351 W. Washington St.
Grayslake 60030

Elgin Community College
1700 Spartan Dr.
Elgin 60120

Illinois Central College
Box 2400
East Peoria 61635

Joliet Junior College
1216 Houbolt Ave.
Joliet 60436

Kankakee Community College
P.O. Box 888
Kankakee 60901

Lakeland College
Mattoun 61938

Lewis and Clark Community College
Godfrey 62035

Lewis University
Route 53
Rockport 60441

John A. Logan College
Carterville 62918

Moraine Valley Community College
10900 S. 88th Ave.
Palos Hills 60465

Oakton Community College
1600 East Gulf
Des Plaines 60016

Parkland College
2400 W. Bradley Ave.
Champaign 61820

Prairie State College
200 E. 197th St.
P.O. Box 487
Chicago Heights 60411

Rock Valley College
3301 N. Mulford Rd.
Rockford 61101

Shawnee College
Shawnee College Rd.
Ullin 62992

State Community College
417 Missouri Ave.
East St. Louis 62201

Thornton Community College
15800 S. State St.
South Holland 60473

Triton College
2000 Fifth Ave.
River Grove 60171

Waubonsee College
Rt. 47 at Harter Rd.
Sugar Grove 60554

Western Illinois University
Adams St.
Macomb 61455

William Rainey Harper College
Algonquin and Roselle Rds.
Palatin 60067

Indiana

Indiana Vocational Technical College
Northwest Region
1440 East 35th Ave.
Gary 46409

Indiana Vocational Technical College
South Bend
1534 W. Sample St.
South Bend 46619

Iowa

Des Moines Area Community College
20006 Ankeny Blvd.
Ankeny 50021

Kirkwood Community College
6301 Kirkwood Blvd., SW
P.O. Box 2068
Cedar Rapids 52406

Southeastern Community College
Drawer F, Highway 406
West Burlington 52655

Kansas

Butler County Community Junior College
Box 888
El Dorado 67042

Dodge City Community Junior College
U.S. 50 By-Pass and 14th Ave.
Dodge City 67801

Hutchinson Community Junior College
1300 North Plum
Hutchinson 67501

Johnson County Community Junior College
12345 College Blvd. at Quivira
Overland Park 66210

Kansas City Kansas Community Junior College
7250 State Ave.
Kansas City 66112

Kentucky

Eastern Kentucky University
College of Law Enforcement
Richmond 40475

Jefferson County Community College
P.O. Box 1036
Louisville 40201

Kentucky State University
Main St.
Frankfort 40601

Lexington Technical Institute
313 Breckinridge Hall
Lexington 40506

Northern Kentucky University
University Dr.
Highland Heights 41076

Paducah Community College
University of Kentucky
P.O. Box 1380
Paducah 42001

Western Kentucky University
Bowling Green 42101

Louisiana

Delgado College
615 City Park Ave.
New Orleans 70119

Louisiana State University at Eunice
P.O. Box 1129
Eunice 70535

Maine

Southern Maine Vocational and Technical Institute
2 Fort Rd.
South Portland 04106

Maryland

Catonsville Community College
800 South Rolling Rd.
Catonsville 21228

Charles County Community College
P.O. Box 910
LaPlata 20646

Community College of Baltimore
Harbor Campus
2901 Liberty Heights Ave.
Baltimore 21215

Hagerstown Junior College
751 Robinwood Dr.
Hagerstown 21740

Montgomery College
51 Manakee St.
Rockville 20850

Massachusetts

Berkshire Community College
West Street
Pittsfield 01201

Bristol Community College
777 Elsbree St.
Fall River 02720

Bunker Hill Community College
Charlestown 02129

Cape Cod Community College
Rt. 132
West Barnstable 02668

Greenfield Community College
Greenfield 01301

Mass Bay Community College
57 Stanley Ave.
Watertown 02172

Massasoit Community College
290 Thatcher St.
Brockton 02402

Middlesex Community College
21 Springs Rd.
Bedford 01730

Mount Wachusett Community College
444 Green St.
Gardner 01440

Northeastern University
360 Huntington Ave.
Boston 02115

North Shore Community College
3 Essex St.
Beverly 01915

Quinsigamond Community College
670 West Boylston St.
Worcester 01606

Springfield Technical Community College
1 Armory Square
Springfield 01105

Michigan

Alpena Community College
666 Johnson St.
Alpena 49707

Charles Steward Mott Community College
1401 East Court St.
Flint 48503

Grand Rapids Junior College
143 Bostwick Ave. NE
Grand Rapids 49502

Henry Ford Community College
5101 Evergreen Rd.
Dearborn 48128

Jackson Community College
2111 Emmons Rd.
Jackson 49201

Kellogg Community College
450 North Ave.
Battlecreek 49016

Lake Michigan College
2755 E. Napier Ave.
Benton Harbor 49022

Lansing Community College
419 N. Capital Ave.
Lansing 48901

Macomb Community College
Box 309
Warren 48093

Madonna College
36600 School Craft Rd.
Livonia 48150

Mid-Michigan Community College
1375 S. Clare Ave.
Harrison 48625

St. Clair County Community College
323 Erie St.
Port Huron 48060

Mississippi
Hinds Junior College
Raymond 39154

Minnesota
Metropolitan Community College
1419 Harmon Place
Minneapolis 55403

Missouri
East Center Missouri Junior College
P.O. Box 529
Union 63084

Jefferson College
Hillsboro 63050

Penn Valley Community College
3201 Southwest Trafficway
Kansas City 64111

St. Louis Community College at Forest Park
5600 Oakland Ave.
St. Louis 63110

St. Louis Community College at Florissant Valley
3400 Pershall Rd.
St. Louis 63135

Montana
College of Great Falls
1301 20th St. S.
Great Falls 59405

Eastern Montana College
1500 North 27th St.
Billings 59101

Nebraska
Mid-Plains Technical Community College
Interstate 20 and Highway 83
North Platte 69101

Southeastern Community College
Lincoln Campus
2120 S. 56th St.
Lincoln 68506

University of Nebraska at Omaha
College of Engineering
P.O. Box 688
Omaha 68101

Western Nebraska Technical College
Sidney 69162

Nevada
Clark County Community College
3200 E. Cheyeene Ave.
Las Vegas 89030

Truckee Meadows Community College
7000 El Rancho Dr.
Sparks 89431

Western Nevada Community College
2201 West Nye Lane
Carson City 89701

New Hampshire
New Hampshire Vocational Technical College
Prescott Hill
Laconia 03246

New Jersey
Atlantic Community College
Black Horse Pike
Mays Landing 08330

Bergen Community College
400 Paramus Rd.
Paramus 07652

Camden County College
P.O. Box 200
Blackwood 08012

Essex County College
303 University Ave.
Newark 07102

Mercer County Community College
1200 Old Trenton Rd.
Trenton 08690

Middlesex County College
Edison 08818

Ocean County College
College Dr.
Toms River 08753

Passaic County Community College
Memorial Dr.
Paterson 07505

Somerset County College
P.O. Box 3300
Somerville 08876

Union College
1033 Springfield Ave.
Cranford 07016

Union County Technical Institute
1776 Raritan Rd.
Scotch Plains 07076

New Mexico
University of Albuquerque
St. Joseph Place NW
Albuquerque 87120

New York
Broome Community College
Upper Front St.
Binghamton 13902

Clinton Community College Point
Bluff Point
Plattsburgh 12901

Erie Community College
Main Street and Youngs Rd.
Amherst 14221

Jamestown Community College
525 Falconer St.
Jamestown 14701

John Jay College of Criminal Justice
City University of New York
445 W. 59th St.
New York 10019

Mercy College
555 Broadway
Dobbs Ferry 10522

Monroe Community College
1000 East Henrietta Rd.
P.O. Box 9720
Rochester 14623

Mohawk Valley Community College
1101 Sherman Dr.
Utica 13501

New York City Community College
City University of New York
300 Jay St.
Brooklyn 11201

Onondaga Community College
Onondaga Hill Rd.
Syracuse 13215

Orange County Community College
115 South St.
Middletown 10940

Rockland Community College
145 College Rd.
Suffern 10901

Schenectady County Community College
Washington Ave.
Schenectady 12305

Suffolk County Community College
533 College Rd.
Selden 11784

Tompkins Cortland Community College
170 North St.
Dryden 13053

Ulster County Community College
Stone Ridge 12484

Westchester Community College
75 Grasslands Rd.
Valhalla 10595

North Carolina
Central Piedmont Community College
P.O. Box 4009
Charlotte 28204

Durham Technical Institute
1637 Lawson St.
P.O. Drawer 11307
Durham 27703

Gaston College
New Dallas Highway
Dallas 28034

Guilford Technical Institute
P.O. Box 309
Jamestown 27282

Forsyth Technical Institute
2100 Silas Creek Parkway
Winston-Salem 27103

James Sprunt Technical Institute
P.O. Box 398
Kenansville 28349

Randolph Technical Institute
Drawer 1009
Asheboro 27203

Richmond Technical Institute
P.O. Box 1189
Hamlet 28345

Western Piedmont Community College
1001 Burkemont Ave.
Morganton 28655

Wilson County Technical Institute
902 Herring Ave.
Wilson 27893

Ohio

Columbus Technical Institute
Box 1609
550 Spring St.
Columbus 43215

Cuyahoga Community College
2900 Community College Ave.
Cleveland 44115

Hocking Technical College
Route 1
Nelsonville 45764

Lakeland Community College
Mentor 44066

Lorain County Community College
1005 N. Abbe Rd.
Elyria 44035

Michael Owens Technical College
30335 Oregon Rd.
Toledo 43699

Sinclair Community College
444 W. 3rd St.
Dayton 45402

Stark Technical College
6200 Frank Ave., NW
Canton 44720

University of Akron
302 E. Bukchtel Ave.
Akron 44325

University of Cincinnati
College of Applied Science
100 E. Central Park
Cincinnati 45210

Oklahoma

Oklahoma State University
301 Campus Fire Station
Stillwater 74074

Oklahoma State University Technical Institute
900 N. Portland St.
Oklahoma City 73107

Tulsa Junior College
10th and Boston Sts.
Tulsa 74119

Oregon

Chemeketa Community College
4000 Lancaster Dr. NE
Salem 97303

Clackamas Community College
19600 Molalla Ave.
Oregon City 97045

Linn-Benton Community College
6500 SW Pacific Blvd.
Albany 97321

Mt. Hood Community College
26000 SE Stark
Gresham 97030

Portland Community College
12000 SW 49th Ave.
Portland 97219

Rogue Community College
3345 Redwood Highway
Grants Pass 97526

Southwestern Oregon Community College
Coos Bay 97420

Umpqua Community College
P.O. Box 967
Roseburg 97470

Pennsylvania

Community College of Allegheny College
Boyce Campus
595 Beatty Rd.
Monroeville 15146

Community College of Philadelphia
34 S. 11th St.
Philadelphia 19107

Delaware Community College
Media 19063

Harrisburg Area Community College
3300 N. Cameron St. Rd.
Harrisburg 17110

Lackawanna Junior College
635 Linden St.
Scranton 18503

Luzerne County Community College
Prospect St. and College Middle Rd.
Nanticoke 18634

Montgomery County Community College
340 Dekalb Pike
Blue Bell 19422

Northampton County Area Community College
3835 Green Pond Rd.
Bethlehem 18017

Westmoreland County Community College
Armbrust Rd.
Youngwood 15697

Rhode Island

Providence College
School of Continuing Education
Providence 02918

Rhode Island Junior College
400 East Ave.
Warwick 02886

South Carolina

Midlands Technical College
Airport Campus
West Columbia 29205

Tennessee

Chattanooga State Technical Community College
4501 Amnicola Highway
Chattanooga 37406

Shelby State Community College
P.O. Box 4563
Memphis 38104

Roane State Community College
P.O. Box 712
Harriman 37748

Texas

Amarillo College
P.O. Box 447
Amarillo 79178

Austin Community College
P.O. Box 2285
Austin 78702

Bee County College
3800 Charco Rd.
Beeville 78120

Blinn College
Brenham 77833

Cisco Junior College
Route 3, Box 3
Cisco 76437

Del Mar College - West Campus
Baldwin at Ayres
Corpus Christi 78404

El Centro College
Main and Lamar Sts.
Dallas 75202

El Paso Community College
6601 Dyer St.
El Paso 79904

Galveston College
4015 Ave. O
Galveston 77550

Houston Community College
22 Waugh Dr.
Houston 77007

Kilgore College
1100 Broadway
Kilgore 75662

Laredo Junior College
P.O. Box 738
Laredo 78040

Midland College
3600 N. Garfield
Midland 79701

Odessa College
P.O. Box 3752
2501 Andrews Highway
Odessa 79760

San Antonio College
1300 San Pedro Ave.
San Antonio 78284

San Jacinto College
8060 Spencer Highway
Pasadena 77505

South Plains College
Levelland 79336

Southern Methodist University
Institute of Management
P.O. Box 319
Dallas 75275

Tarrant County Junior College
Electric Service Building
Fort Worth 76102

Temple Junior College
2600 S. First St.
Temple 76501

Texas Southmost College
83 Fort Brown St.
Brownsville 78520

Texas State Technical Institute
James Connally Campus
Waco 76705

Texarkana Community College
2500 N. Robison Rd.
Texarkana 75501

Tyler Junior College
Henderson Highway
Tyler 75701

Victoria College
2200 E. Red River
Victoria 77901

Utah
Utah Technical College
1395 North 150 E
Provo 84601

Vermont
Champlain College
232 S. Willard St.
Burlington 05401

Virginia
Blue Ridge Community College
P.O. Box 80
Weyers Cave 24486

Central Virginia Community College
P.O. Box 4098, Forth Hill Station
Lynchburg 24502

Northern Virginia Community College
8333 Little River Turnpike
Annandale 22003

J. Sargeant Reynolds Community College
108 E. Grace St.
P.O. Box 12084
Richmond 23241

Thomas Nelson Community College
P.O. Box 9407
Hampton 23670

Tidewater Community College
Virginia Beach Campus
1700 College Crescent
Virginia Beach 23456

Washington
Bates Vocational Technical Institute
1101 S. Yahima Ave.
Tacoma 98405

Clark College
1800 E. McLoughlin Blvd.
Vancouver 98663

Columbia Basin Community College
2600 N. 20th Ave.
Pasco 99301

Edmonds Community College
20000 68th Ave. W
Lynnwood 98036

Everett Community College
801 Wetmore
Everett 98201

Gray's Harbor College
Aberdeen 98520

North Seattle Community College
9600 College Way N
Seattle 98103

Port Steilacoom Community College
9401 Farwest Dr. SW
Tacoma 99498

Spokane Community College
E 3403 Mission Ave.
Spokane 99202

University of Washington
Seattle 98195

Wenatchee Valley College
1300 Fifth St.
Wenatchee 98801

Whatcom Community College
5217 Northwest Rd.
Bellingham 98225

Yakima Valley Community College
South 16th Ave. at Nob Hill Blvd.
Yakima 98907

West Virginia
Fairmont State College
Locust Ave.
Fairmont 26554

Marshall University
Huntington 25701

Parkersburg Community College
Route 5, Box 167-A
Parkersburg 26101

Sheperd College
Sheperdstown 25443

West Virginia Northern Community College
College Square
Wheeling 26003

West Virginia State College
Institute 25112

Wisconsin
Blackhawk Technical Institute
2228 Center Ave.
Janesville 53545

Fox Valley Technical Institute
1825 North Bluemound Dr.
P.O. Box 888
Appleton 54911

Gateway Technical Institute
1001 S. Main St.
Racine 53403

Madison Area Technical College
211 North Carroll St.
Madison 53703

Milwaukee Area Technical College
1015 N. 6th St.
Milwaukee 53203

Northeast Wisconsin Institute
2740 W. Mason St.
Green Bay 53403

Wyoming
Laromic County Community College
1400 E. College Dr.
Cheyenne 82001

Source: International Society of Fire Service Instructors College Section and NFPA Fire Service Training and Education Survey.

State Directors of Fire Service Education

Alabama
W. W. Smith
Alabama State Fire College
2015 McFarland Blvd., E.
Tuscaloosa 35405
(205) 348-6241 or (205) 798-2613

Alaska
William A. Hagevig
Fire Service Training
Pouch F, Staff Office Building
Juneau 99811
(907) 465-4585 or (907) 364-2154

Arizona
Herbert Hoey
State Fire Marshal Office
Box 19070
Phoenix 85005
(602) 225-5062

Arkansas
Paul S. Benton
Fire Training Academy
P.O. Box 3048
East Camden 71701
(501) 574-1521

California
Edward W. Bent
State Fire Marshal Headquarters
7171 Bowling Dr., #800
Sacramento 95823
(916) 427-4166 or (916) 422-8175

Colorado
Joe Lewand
Fire Service Training
12600 W. 6th Ave.
Golden 80401
(303) 988-6160

Connecticut
Wayne Sandford
Fire Administration
294 Colony St.
Meriden 06450
(203) 238-6587

Delaware
Louis J. Amabili
Delaware State Fire School
RD #2, Box 166
Dover 19091
(302) 736-4773 or (302) 653-7897

District of Columbia
Ted Coleman
District of Columbia Fire Dept.
4600 Overlook Ave., SW
Washington, DC 20032
(202) 745-2247

Florida
Director
Fire Standards and Training
1822 SE 8th Ave.
Ocala 32670
(904) 732-0526

Georgia
Harold G. Thompson
Georgia Fire Academy
1112 Clay St.
Marietta 30060
(404) 424-7315 or (404) 938-2976

Hawaii
Richard K. Miyashiro
Coordinator-Instructor
2612 Alani Dr.
Honolulu 96822
(808) 988-2224

Idaho
Tom Tyree
Fire Service Training
P.O. Box 1238
Twin Falls 83301
(208) 733-9554

Illinois
Gerald Monigold
University of Illinois
Fire Service
301 S. Wright
Champaign 61801
(217) 333-3800 or (217) 359-2649

Indiana
William C. Goodwin
State Fire Marshal
502 Indiana St.
Office Building
Indianapolis 46204
(317) 232-2222 or (317) 898-5032

Iowa
Keith Royer
Fire Service Extension
Iowa State University
Ames 50011
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Augusta 04330
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Pete Cachat
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500 W. 17th
Cheyenne 82002
(307) 777-7288

WE WANT TO KNOW . . .

if a name, an address, or a phone number has changed; if there's an upcoming event, a new program or course, a new publication being offered. If you have more current information than is contained in this *Almanac*, know something that should be included in this book, or just have something interesting about the fire protection scene that you want to contribute, please let us know. Write: Editor, *Fire Almanac*, NFPA, Batterymarch Park, Quincy, MA 02269. All suggestions will receive our careful attention.

STATE FIRE SERVICE TRAINING FACILITIES

State	Facility Name/Address	Residential	Food Service	No. of Classrooms	Capacity of Largest Classroom or Auditorium	Total Capacity of School	Fixed Training Aids On Site
Alabama	Alabama State Fire College 2015 McFarland Blvd., Tuscaloosa	no	no	6	200	325	Tower, structural burn building, smoke building, flammable liquids tank, sprinkler laboratory, flammable gas props, fire extinguisher training facility, flammable liquids pit, inclined trough to provide a running flammable liquid fire.
Alaska	Anchorage Regional Fire Training Center 1140 Airport Heights Rd. Anchorage 99504	yes	no	5	40	180–200	Tower, structural burn building, smoke building, sprinkler laboratory, vehicles, fire extinguishers training facility.
	Juneau Regional Fire Training Center Sherwood Lane Juneau 99801	no	no	0			Tower, structural burn building, smoke building, flammable liquids tank, sprinkler laboratory, flammable gas props, fire extinguisher training facility, marine fire fighting capability (including damage control and shipboard rescue).
	Fairbanks Regional Fire Training Center Lathrop Ave. Fairbanks 99701 Under Construction	no	no	1	40	40	Tower, structural burn building, smoke building, sprinkler laboratory, vehicles, fire extinguisher training facility.
Arizona	No state-owned fire training facilities						

Arkansas	Arkansas Fire Academy P.O. Box 3048 East Camden 71701	yes	yes	3	100	300	Tower, structural burn building, smoke building, flammable liquids tank, flammable gas props, vehicles, fire extinguisher training facility, rescue facilities.
California	No state-owned fire training facilities						
Colorado	No state-owned fire training facilities						
Connecticut	No state-owned fire training facilities						
Delaware	Delaware State Fire School R.D. #2, Box 166 Dover 19901	no	yes	5	250	650	Tower, structural burn building, smoke building, flammable liquids tank, flammable gas props, fire extinguisher training facility, forcible entry building, flammable liquids pit, flammable liquids props.
Florida	Florida State Fire College 1501 SW Broadway Ocala 32670	no	no	3	125	250	Tower, structural burn building, smoke building, flammable liquids tank, sprinkler laboratory, flammable gas props, vehicles, fire extinguisher training facility, drafting pit.
Georgia	Georgia Fire Academy Marietta	no	no	2	60	80	Tower, structural burn building, smoke building, sprinkler laboratory.
Hawaii	A training facility for the County of Hawaii is now in the planning stage. It will be shared by the Honolulu Fire Departments and the Federal Fire Departments.						

State	Facility Name/Address	Residential	Food Service	No. of Classrooms	Capacity of Largest Classroom or Auditorium	Total Capacity of School	Fixed Training Aids On Site
Idaho	No state-owned fire training facilities						
Illinois	Illinois Fire Service Institute Training Grounds Urbana/Champaign	no	no	1	75	75	Tower, structural burn building, smoke building, flammable liquids tank, flammable gas props, vehicles, fire extinguisher training facility.
Indiana	No state-owned fire training facilities						
Iowa	Fire Service Extension Building Iowa State University Ames	no	no	8	250	350	Flammable liquids tank, flammable gas props, fire extinguisher training facility, high voltage.
	Iowa State Center Coliseum and Continuing Education Building	yes	yes	31	14,000+	25,000+	
Kansas	No state-owned fire training facilities						
Kentucky	No state-owned fire training facilities						
Louisiana	Louisiana State University	no	no	4	300	420	Tower, structural burn building, smoke building, flammable liquids tank, sprinkler laboratory, flammable gas props, aircraft mockup, vehicles, fire extinguisher training facility.
Maine	No state-owned fire training facilities						

Maryland	Maryland Fire and Rescue Institute University of Maryland College Park 20472						
Massachusetts	Massachusetts Fire Fighting Academy Basic Training Facility Stow	no	no	2	100	135	Tower, smoke building, flammable liquids tank and props, sprinkler laboratory, vehicles, fire extinguisher training facility.
	C.D. Training Academy Topsfield	yes	yes	4	40	150	Tower, structural burn building, flammable liquids tank, flammable gas props, vehicles, fire extinguisher training facility, heavy rescue.
	Barnstable Training Facility Hyannis	no	no	2	150	200	Tower, structural burn building, smoke building, flammable liquids tank, sprinkler laboratory, vehicles, fire extinguisher training facility.
	Massachusetts Fire Fighting Academy Headquarters Sudbury	no	no	6	150	300	None.
	Massachusetts Fire Fighting Academy Hopkinton	no	no	1	30	30	Flammable gas props.
Michigan	University of Michigan Ann Arbor	yes	yes	3	30	90	Tower, structural burn building, smoke building, flammable liquids tank, fire extinguisher training facility.
Minnesota	No state-owned fire training facilities.						

State	Facility Name/Address	Residential	Food Service	No. of Classrooms	Capacity of Largest Classroom or Auditorium	Total Capacity of School	Fixed Training Aids On Site
Mississippi	Mississippi Fire Academy Rankin County	no	no	8	200	715	Tower, structural burn building, smoke building, flammable liquids tank, sprinkler laboratory, flammable gas props, vehicles, fire extinguisher training facility, control tower.
Missouri	No state-owned fire training facilities						
Montana	No state-owned fire training facilities						
Nebraska	Nebraska Fire Service Lincoln	no	no	1	35	35	Vehicles.
Nevada	No state-owned fire training facilities						
New Hampshire	No state-owned fire training facilities						
New Jersey	No state-owned fire training facilities						
New Mexico	No state-owned fire training facilities						
New York	The Senator Frederick L. Warder Academy of Fire Science Montour Falls	yes	yes	12	300	450–500	Structural burn building, flammable liquids tank, sprinkler laboratory, vehicles, fire extinguisher training facility. To be constructed: smoke building and flammable gas props.

North Carolina	Department of Community Colleges operates or assists in the operation of 30 regional training facilities, all of which are owned by some combination of county, city, or state.	no	yes	Not on Site	100–350		Tower, structural burn building, smoke building, flammable liquids tank, sprinkler laboratory, flammable gas props, aircraft mockup, vehicles, fire extinguisher training facility.
	Department of Insurance No state-owned fire training facilities						
North Dakota	No state-owned fire training facilities						
Ohio	Ohio Fire Academy Reynoldsburg	yes	yes	9	200	350	Tower, smoke building, flammable liquids tank, sprinkler laboratory, flammable gas props, aircraft mockup, vehicles, fire extinguisher training facility, SCBA situation maze.
Oklahoma	Fire Service Training Oklahoma State University Stillwater 74074	no	no	Under Construction			Tower, flammable liquids tank, sprinkler laboratory, fire extinguisher training facility. Interior fire attack facility.
Oregon	No state-owned fire training facilities						
Pennsylvania	Pennsylvania State Fire Training School Lewistown	no	no	6	275	320	Tower, structural burn building, smoke building, flammable liquids tank, sprinkler laboratory, flammable gas props, vehicles, fire extinguisher training facility, pump laboratories.

State	Facility Name/Address	Residential	Food Service	No. of Classrooms	Capacity of Largest Classroom or Auditorium	Total Capacity of School	Fixed Training Aids On Site
Rhode Island	Community College of Rhode Island, Knight Campus 400 East Ave. Warwick	no	yes	40	1,000	2,000	Flammable gas props, vehicles, fire extinguisher training facility, ice rescue in season.
South Carolina	South Carolina Fire Academy West Columbia 29169	no	no	4	125	210	Tower, structural burn building.
South Dakota	No state-owned fire training facilities						
Tennessee	Tennessee State Fire School 1303 Old Fort Parkway Murfreesboro 37130	no	yes	6	100	200	Tower, structural burn building, smoke building, sprinkler laboratory, flammable gas props, fire extinguisher training facility, smoke/rescue mask training facility.
Texas	Brayton Firemen Training Field Texas A&M University College Station	yes	yes	4	3,000	2,000	Tower, structural burn buildings, smoke building, flammable liquids tank, sprinkler laboratory, flammable gas props, aircraft mockup, vehicles, fire extinguisher training facility, pumper test pits, forcible entry training aid, pump maintenance training aid, rescue props, shipboard fire props, pipe rack fire props, progress unit fire props, chemical complex fire props, LNG fire props, fire extinguisher systems facility.

Utah	No state-owned fire training facilities						
Vermont	USFA Training Center, Inc. Pittsford In development	yes	yes				Tower.
Virginia	State Fire Training Center Ashland Leased by State	no	no	2	75	115	Tower, structural burn building, smoke building, flammable liquids tank, sprinkler laboratory, flammable gas props, vehicles, drafting pond.
Washington	Washington State Fire Training Center I-90 East of North Bend To be completed 1983	no	no	2	60		Tower, structural burn building, smoke building, flammable liquids tank, sprinkler laboratory, flammable gas props, aircraft mockup, vehicles, fire extinguisher training facility, shipboard.
West Virginia	West Virginia Fire Service Extension Morgantown	yes	yes	3			Tower, structural burn building, vehicles.
	Tri-State Fire School Huntington	nc	no	5–7	150	350	Tower, smoke building, flammable liquids tank.
Wisconsin	Milwaukee Fire Academy 6680 N. Teutonia Ave. Milwaukee	Under Construction	no	8	400	650	Tower, structural burn building, smoke building, flammable liquids tank, sprinkler laboratory, flammable gas props, vehicles, fire extinguisher training facility, fire boats.
Wyoming	No state-owned fire training facilities						

Fire Fighter Safety

Fire Fighter Deaths and Injuries

Because fire fighters work in hazardous environments, they face special health hazards that increase the risk of accidental death and injury. Fatal accidents and injuries may not be entirely preventable, but understanding how they occur is necessary so that specific corrective actions can be developed to minimize the inherent risks.

The NFPA studies fire fighter deaths and injuries to provide national statistics on their frequency, extent, and characteristics and, ultimately, to improve the safety of all fire fighters.

Fire Fighter Deaths

Total and by Nature of Injury by Year (1977-81)

The NFPA annually seeks data on all fire fighter deaths in the line of duty, and prepares a report that summarizes findings.[1,2,3,4,5]

According to reports verified by the NFPA, there were 134 fire fighter deaths in 1977. There was an increase of 20.9 percent in 1978 to 162 fire fighter deaths; by nature of fatal injury, the increase in fire fighter deaths was primarily the result of increases in the

Fire fighters search through rubble for the bodies of a 28-year-old fire fighter and a 78-year-old resident of this multiple-occupancy mercantile and residential building in Petersburg, VA. A fire and series of explosions caused the collapse of the building and injuries to 27 persons, including 11 fire fighters. Loss was estimated at $3,500,000. (Clement Britt, Richmond Newspapers, Inc.)

number of deaths due to traumatic injuries (e.g., wound, cut, bleeding, dislocation, fracture), smoke inhalation, and heart attacks. In 1979, there was a 30.2 percent decrease to 113 deaths; the decrease in deaths was due to a lowering of the unusually high number of deaths due to traumatic injuries, smoke inhalation, and heart attacks that occurred in 1978. In 1980, there were 134 fire fighter deaths, an increase of 18.5 percent over 1979; the increase was primarily the result of increases in the number of fire fighter deaths due to traumatic injuries, and heart attacks. There was a decrease of 8.3 percent in 1981 to 123 fire fighter deaths, primarily the result of a decrease in the number of fire deaths due to traumatic injuries.

By nature of injury over the five-year period, heart attacks were the leading type of injury accounting for 44.9 percent of all fire fighter fatalities. Over the 1975-1981 period, the annual proportion of fire fighter deaths from heart attacks ranged from 38.9 to 46.1 percent (see graph). The consistently high proportion of heart attack deaths points to the importance of coronary artery disease, the primary condition that precipitates heart attacks, as a major health problem among fire fighters. For example, in 1980, autopsies were available for 21 fire fighters who died from heart attacks. Nineteen were found to have severe arteriosclerosis which caused the fatal heart attacks. The extent of coronary heart disease in fire fighters has been documented by other researchers. In their 1979 Annual Death and Injury Survey of career U.S. and Canadian fire fighters, the International Association of Fire Fighters reported that 57 percent of the 77 deaths from occupational diseases were due to heart disease.[6] Based on extensive studies of Los Angeles City and New York City fire fighters, Barnard concluded that fire fighters have an abnormally high incidence of coronary heart disease, especially since they are a medically selected population with low risk factors for the disease.[7] Years of exposure to the stress encountered on the job, to carbon monoxide, and to other factors that greatly increase the heart's oxygen requirements, take a heavy toll.

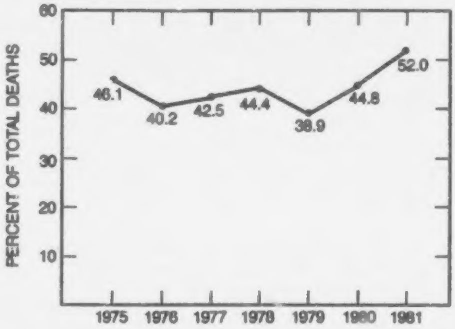
The seriousness of these findings has generated widespread concern for improving the health status of fire fighters. Increasing numbers of fire departments are instituting health maintenance programs aimed at reducing the risks of developing coronary heart disease. The programs include periodic medical examinations, rigorous physical fitness activities, and educational programs on nutrition, weight control, substance abuse, and reduction of stress. These programs should continue to gain support and become established in many more fire departments throughout the country. (For some of these programs, see the report on safety programs in this section.)

FIRE FIGHTER DEATHS IN THE LINE OF DUTY
TOTAL AND BY NATURE OF FATAL INJURY BY YEAR (1977-1981)

Nature of Fatal Injury	1977	1978	1979	1980	1981
TOTAL	134	162	113	134	123
Burns and Smoke Inhalation	2	0	13	4	4
Burns Only	12	9	4	7	3
Smoke Inhalation Only	14	24	13	10	13
Traumatic*	36	47	24	38	27
Heart Attack	59	72	44	60	64
Electrocution	4	5	1	3	5
Drowning	7	3	0	6	3
Internal Injury Not Classified	0	1	13	5	2
Other	0	1	1	1	2

These figures are based on the annual NFPA fire fatality study (1977-1981).

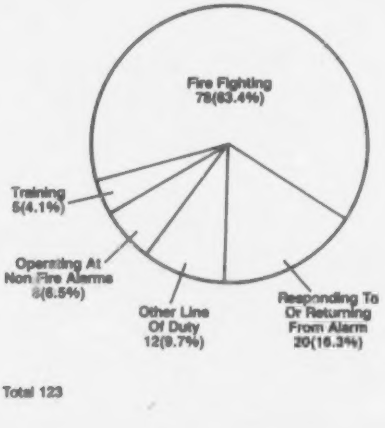
*Includes cases where the fatal injury was of a traumatic nature, e.g., wound, cut, bleeding, dislocation, fracture.



Another major category of nature of fatal injury for the five-year period was traumatic injuries accounting for 25.8 percent of all fire fatalities; this type of injury is often the result of vehicle and apparatus accidents while responding to or returning from an incident, structural collapse, and falls. The exposure to fire products categories (burns and smoke inhalation, burns only, and smoke inhalation only) accounted for a considerable 19.8 percent of all fire fighter fatalities during the five-year period. The proper use of self-contained breathing apparatus (SCBA) is vital to the safety of fire fighters.[8] (See Use of Self-Contained Breathing Apparatus, later in this section.)

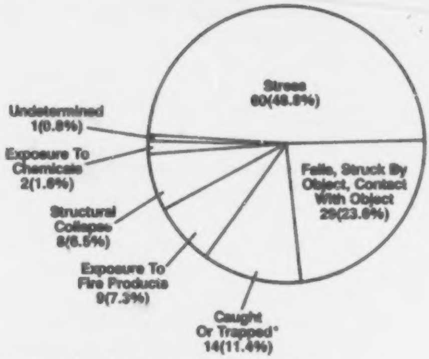
Type of Duty (1981)

The largest proportion of deaths, 63.4 percent, occurred during fire ground operations. The number of fire ground deaths has remained relatively constant since 1978. Deaths that occurred while responding to or returning from fire and nonfire alarms accounted for 16.3 percent. Eight deaths (6.5 percent) took place during operations at nonfire incidents, which include auto accidents and water rescues. Training accounted for 4.1 percent of the deaths. Twelve deaths (9.7 percent) occurred during all other nonfire on-duty activities, e.g., working at the station, maintenance of equipment and inspections.



Total 123

Only two firehouses in the United States are listed on the National Register and are still functional — the Washington company firehouse in Conshohocken, Pennsylvania and the renovated central fire station in Cortland, New York.



*Prior to 1981. Caught or Trapped was combined with Falls, Struck By Object, and Contact With Object.

Total 123

Cause of Fatal Injury or Illness (1981)

As in the previous four years, the primary cause of death was stress[9] (48.8 percent). The second largest cause of death was from falls, struck by object and contact with object (23.6 percent). These 29 deaths included 10 in motor vehicle accidents, 2 in aircraft crashes, 1 fire fighter struck while crossing a highway, 5 electrocutions, 4 falls from emergency apparatus, 4 falls in or from structures, 2 fire fighters murdered in a firehouse, and 1 fire fighter knocked to the ground protecting fire department equipment during a disturbance. The category of caught or trapped (11.4 percent) includes 3 drownings.

Exposure to fire products was the cause in only nine deaths in 1981. Six were attributed to exposure to smoke and three to fire. Structural collapse accounted for 8 deaths (6.5 percent), down from 14 deaths in 1980. Of these, 1 death was caused by a roof collapse, 1 from a chimney collapse, 3 each from wall and ceiling collapses. Two deaths resulted from exposure to chemicals. In one incident, a fire fighter died of asphyxiation while testing apparatus engines in a fire station without adequate ventilation. In the other incident, a fire fighter was overcome due to lack of oxygen while working in an atmosphere of methane gas as he was attempting to rescue a child from a septic tank.

Use of Self-Contained Breathing Apparatus (1981)

In the 1981 fire fighter fatality study, the use of self-contained breathing apparatus (SCBA) was examined in deaths associated with exposure to fire products, structural collapse, and caught or trapped by flashover or backdraft. In the nine deaths caused by exposure to fire products, none of the fire fighters were equipped with SCBA. The three exposed to flame died of burns. Two of the six exposed to smoke died of smoke inhalation; the other four died of heart attacks.

In other incidents, where the cause of fatal injury was structural collapse or caught or trapped by flashover or backdraft, another 14 fire fighters died of smoke inhalation and burns. Of these, one was not using SCBA. This fire fighter was with a United States Department of Agriculture (USDA) Forest Service engine crew overrun by fire during an attack on a brush fire.

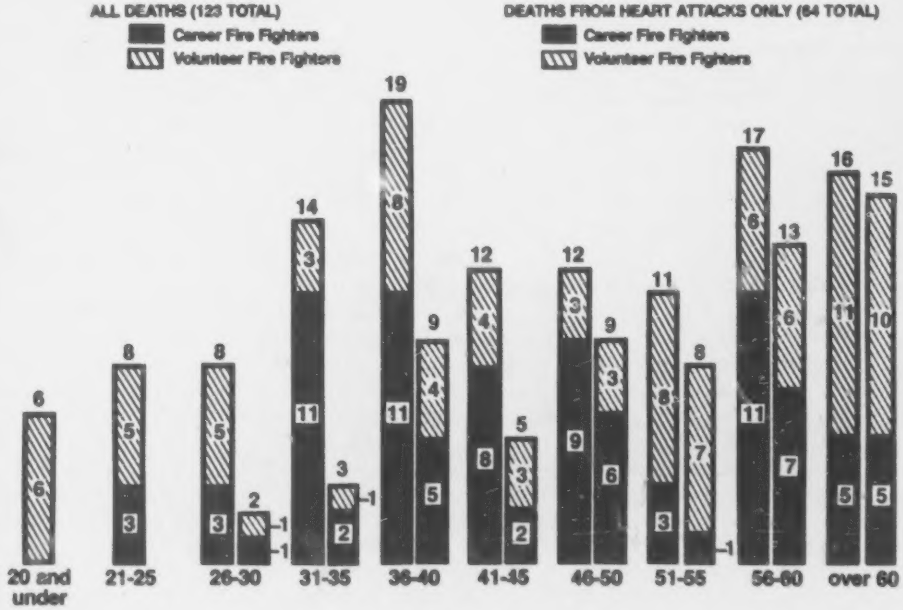
The 13 cases in which fire fighters were using SCBA were examined to determine recurring scenarios. After flashover, one fire fighter was trapped by fire and four others, in two separate incidents, became disoriented and exhausted the air in their tanks. After structural collapse, two fire fighters in one incident were trapped under debris, and two in another incident were trapped by fire. One fire fighter fell through a roof when it collapsed; he died of burns and smoke inhalation. In one incident, after flashover blocked a fire fighter's escape, he damaged his SCBA trying to squeeze through a locked door to a fire escape and died of burns and smoke inhalation. In another incident, two fire fighters were suddenly engulfed in heavy smoke while searching for the source of smoke and became lost in the cellar of a building.

Ages of Fire Fighter Fatalities (1981)

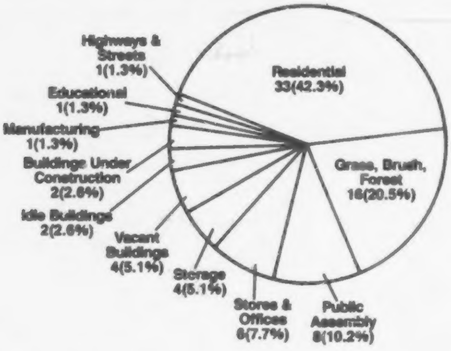
The ages of fire fighters who died in the line of duty in 1981 ranged from 17 to 77 years, with a mean age of 44 years. As shown in the graph, the distribution has two peak age groupings, with the largest number of deaths occurring between ages 36 and 40 and the second largest between 56 and 60.

The lowest number of deaths occurred in the 20 years and under group. The numbers then climb to the first peak at 36 to 40 years, drop and level off between the ages of 41 to 55 and then peak again at 56 to 60 years before declining again. As has been reported in previous years, this distribution reflects the different factors responsible for the deaths of younger and older fire fighters. Heart attacks are the primary cause of death in fire fighters over age 45, while 75.4 percent of fire fighters 45 years and under died of traumatic injuries, such as wounds, fractures, electrocution, and drowning. Fire fighters 45 and under accounted for 95 percent of deaths caused by burns and/or smoke inhalation.

The graph also shows the age distribution for heart attacks. Again in 1981, the proportion of heart attacks among older fire fighters is very high. Nine out of 12 fire fighters (75 percent) between 46 and 50 years died of heart attacks. The proportions in the next two intervals are 72.7 percent and 76.5 percent, respectively. For fire fighters over 60, the proportion reaches a high of almost 94 percent. Taken together, 80 percent of fire fighters over age 45 died of heart attacks.



Just under 39,000 ambulances were being used in EMS programs in 1982. Most carried equipment recommended by the American College of Surgeons and were equipped to communicate with their base stations.



Total 78

Fire Ground Deaths by Property Type (1981)

Residential properties made up the largest proportion of fire ground deaths (42.3 percent) in 1981. Twenty-seven of these 33 deaths occurred in one- and two-family dwellings. The next largest category includes grass, brush, and forest fires, which accounted for 16 deaths (20.5 percent). Public assembly properties accounted for 10.2 percent; of these eight deaths, five were in restaurants, two were in taverns, and one was in a church hall. Stores and offices accounted for 7.7 percent. Vacant properties were involved in 5.1 percent of the deaths. The remaining properties include storage (5.1 percent), construction sites (2.6 percent), and idle property (2.6 percent). One death each occurred in a high school, a laundry/dry-cleaning plant, and at a vehicle fire on a public street.

To account for the relative experience of different property types, the number of deaths per 100,000 fires was examined according to property use. Estimates of the experience for each property type were obtained from the NFPA 1981 fire loss study. Looking at fires in public assembly properties, storage facilities, and stores and offices, there were 11.5 deaths per 100,000 fires compared to 4.5 deaths per 100,000 residential fires. Although the death rate for nonresidential properties is slightly lower than that calculated last year (14.1 deaths per 100,000 fires in 1980), the rate is still almost three times that of residential properties. Although fewer fires occur in nonresidential occupancies, death rates are higher in these property types because more hazardous materials are present and greater fire fighting problems are encountered than in residential properties.

Career and Volunteer Comparison (1981)

When career fire fighter deaths were examined by rank, 64.0 percent were fire fighters, 26.6 percent were company officers, and 9.4 percent were chief officers. For volunteers, 71.2 percent of the fatalities were fire fighters, 13.6 percent were company officers, and 15.2 percent were chief officers.

In 1980, the greatest proportion of deaths for both career and volunteer fire fighters occurred among those with five or fewer years of experience. In 1981, for career fire fighters, the proportion of deaths in each five-year interval was fairly stable up to 25 years of service. For volunteers, the greatest proportion of deaths (33.3 percent) occurred in the interval of five years or less, as has happened in both 1979 and 1980. Fire fighters with 10 years of service or less accounted for 55.5 percent of the volunteer deaths.

The ages of the career fire fighters who died in 1981 ranged from 21 to 77 years, with a mean age of 44.3. For volunteer fire fighters, the range was from 17 to 74 years with a mean age of 44.4 years. Six fire fighters age 20 and younger died in 1981; all were volunteer. The proportion of volunteer fire fighters who died over age of 50 is 42.4 percent compared to 29.7 percent for career fire fighters.

COMPARISON OF LINE-OF-DUTY DEATHS

	Career		Volunteer[a]	
	Number of deaths	Percent of deaths	Number of deaths	Percent of deaths
Type of duty				
Operating at fire ground	43	67.2	35	59.3
Responding to or returning from alarm	6	9.4	14	23.7
Operating at nonfire alarm	2	3.1	6	10.2
Training	3	4.7	2	3.4
Other line of duty	10	15.6	2	3.4
Totals	64	100.0	59	100.0
Cause of fatal injury				
Exposure to chemicals	0	0.0	2	3.4
Caught/trapped	6	9.4	8	13.6
Undetermined	1	1.5	0	0.0
Exposure to fire products	6	9.4	3	5.0
Structural collapse	6	9.4	2	3.4
Falls, struck by object, contact with object	18	28.1	11	18.7
Stress	27	42.2	33	55.9
Totals	64	100.0	59	100.0
Nature of fatal injury				
Burns and smoke inhalation	2	3.1	2	3.4
Burns only	2	3.1	1	1.7
Smoke inhalation only	7	11.0	6	10.2
Wound, cut, bleeding	5	7.8	1	1.7
Fracture	13	20.3	8	13.5
Heart attack	29	45.3	35	59.3
Electrocution	3	4.7	2	3.4
Drowning	1	1.6	2	3.4
Inhalation of nonfire gases	0	0.0	2	3.4
Internal injury not classified above	2	3.1	0	0.0
Totals	64	100.0	59	100.0
Ages of fire fighters				
All deaths				
20 and under	0	0.0	6	10.2
21 to 25	3	4.7	5	8.5
26 to 30	3	4.7	5	8.5
31 to 35	11	17.2	3	5.1
36 to 40	11	17.2	8	13.5
41 to 45	8	12.5	4	6.8
46 to 50	9	14.0	3	5.1
51 to 55	3	4.7	8	13.5
56 to 60	11	17.2	6	10.2
over 60	5	7.8	11	18.6
Totals	64	100.0	59	100.0

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[a] For this report the term *volunteer* refers to any fire fighter who is not a full-time, paid member of a fire department.

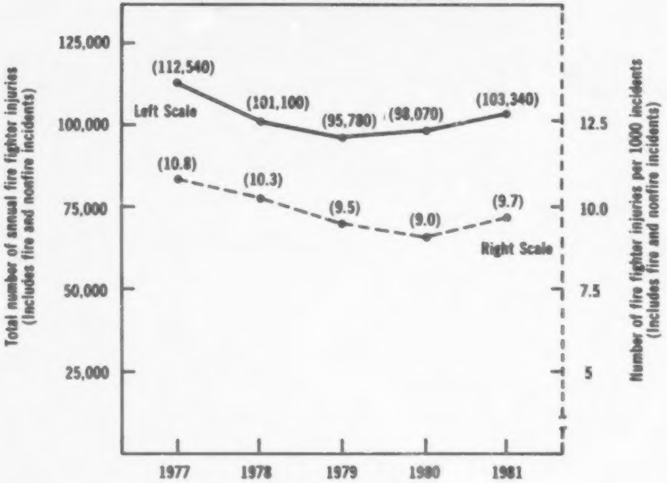
[b] This information was not available for all cases.

[c] Since these attributes are not mutually exclusive, totals and percentages are not shown.

BETWEEN CAREER AND VOLUNTEER FIRE FIGHTERS, 1981

	Career *Number of deaths*	**Career** *Percent of deaths*	**Volunteer**[a] *Number of deaths*	**Volunteer**[a] *Percent of deaths*
Ages of fire fighters				
Deaths from heart attacks only				
26 to 30	1	3.5	1	2.9
31 to 35	2	6.9	1	2.9
36 to 40	5	17.2	4	11.4
41 to 45	2	6.9	3	8.6
46 to 50	6	20.7	3	8.6
51 to 55	1	3.5	7	20.0
56 to 60	7	24.1	6	17.1
over 60	5	17.2	10	28.5
Totals	29	100.0	35	100.0
Fire ground deaths by fixed property use				
Public assembly	4	9.3	4	11.4
Educational	1	2.3	0	0.0
Residential	16	37.2	17	48.6
Stores, offices	4	9.3	2	5.7
Manufacturing	0	0.0	1	2.9
Storage	2	4.7	2	5.7
Construction sites	2	4.6	0	0.0
Vacant buildings	3	7.0	1	2.9
Idle buildings	0	0.0	2	5.7
Grass, brush, forest	10	23.3	6	17.1
Public street	1	2.3	0	0.0
Totals	43	100.0	35	100.0
Rank				
Fire fighter	41	64.0	42	71.2
Company officer	17	26.6	8	13.6
Chief officer	6	9.4	9	15.2
Totals	64	100.0	59	100.0
Years of service[b]				
5 or less	8	14.0	18	33.3
6 to 10	11	19.3	12	22.2
11 to 15	9	15.8	6	11.1
16 to 20	11	19.3	3	5.6
21 to 25	9	15.8	7	13.0
26 to 30	5	8.8	3	5.6
over 30	4	7.0	5	9.2
Totals	57	100.0	54	100.0
Attributes of fire ground deaths[c]				
Incendiary/suspicious fires	14		5	
Search/rescue operations	7		3	
Vacant buildings	3		1	
Motor vehicle accidents	8		9	
False alarms	2		0	

Total number of annual fire fighter injuries (left scale)
and number of fire fighter injuries per 100 incidents (right scale)
(Includes fire and nonfire incidents) by year (1977-1981)



Source: NFPA's Annual Survey of Fire Department for U.S. Fire Experience (1977-81)

Fire Fighter Injuries

Annual Number of Fire Fighter Injuries and Injury Rates (1977-81)

The NFPA annually reports on fire fighter injury experience based on the NFPA survey of fire departments.[10,11,12] The total number of fire fighter injuries has shown a steady decrease during the 1977-79 period from 112,540 in 1977 to 95,780 in 1979, a decrease of 14.9 percent over the two-year period. However, the number of fire fighter injuries were on the upswing during the 1980-81 period, with increases in 1980 to 98,070 and in 1981 to 103,340. Examination of the number of fire fighter injuries per thousand incidents (includes fire and non-fire incidents) indicates a steady decrease during the 1977-80 period from 10.8 per thousand in 1977 to 9.0 per thousand in 1980, but on the upswing in 1981 to 9.7 per thousand.

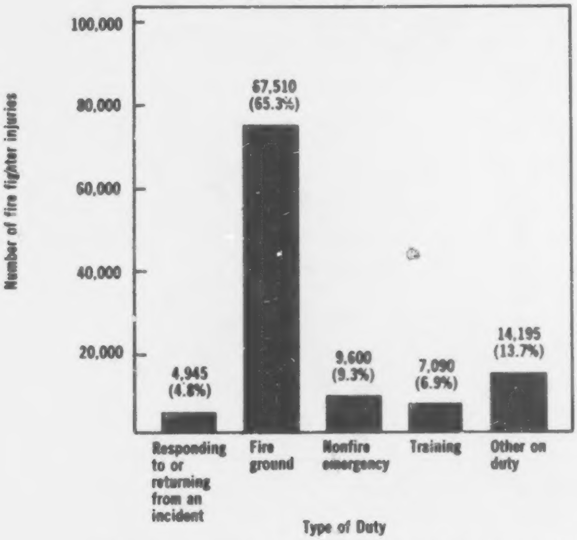
Other statistical measures for evaluating fire fighter injury risk indicate that for the 1977-81 period, there were 24.1 fire fighter injuries for every 1,000 fires attended, and that for the 1979-81 period, 11.4 percent of all fire fighter injuries resulted in admission to a hospital.

Fire Fighter Injuries By Type of Duty (1981)

Results for 1981 included breakdowns on responding to or returning from an incident and at a non-fire emergency which in past surveys had been combined under one category, other incident related. Results indicate that once again, most fire fighter injuries — 67,510 or 65.3 percent — of all fire fighter injuries occurred during fire ground operations. Looked at another way, 23.3 fire fighters were injured for every 1,000 fires attended by fire departments nationwide in 1981.

Fire Fighter Injuries by Nature of Injury and Type of Duty (1981)

Results indicate that the three major types of injuries that occurred during fire ground operations in 1981 were: wound, cut, bleeding, bruise (27.0 percent); strain, sprain (24.4 percent); and smoke or gas inhalation (18.5 percent). The conscientious use of self-



Fire fighter injuries by type of duty, 1981

Source: NFPA's Survey of Fire Departments for U.S. Fire Experience (1981)

contained breathing apparatus and other protective equipment along with training and effective fire ground management would certainly help in a campaign to reduce inhalation injuries.

Results were quite consistent during all non-fire ground activities with strains and sprains accounting for 43.3 percent of all non-fire ground injuries and wound, cut, bleeding, bruise accounting for 25.9 percent.

Fire fighter injuries by nature of injury and type of duty, 1981

Nature of injury	Responding to or returning from an incident		Fire ground		Nonfire emergency		Training		Other on-duty	
	Number	Percent of	Number	Percent of	Number	Percent of	Number	Percent of	Number	Percent of
Burns (fire or chemical)	—	—	7,545	11.2	240	2.5	630	8.9	—	—
Smoke or gas inhalation	—	—	12,485	18.5	415	4.3	270	3.8	—	—
Eye irritation	270	5.5	5,315	7.9	290	3.0	465	6.6	680	4.8
Wound, cut, bleeding, bruise	1,345	27.2	18,235	27.0	2,530	26.4	1,655	23.4	3,750	26.4
Dislocation, fracture	350	7.1	2,220	3.3	320	3.3	525	7.4	850	6.0
Stroke	0	0	30	.1	0	0	0	0	30	.2
Heart attack	55	1.1	270	.4	70	.7	10	.1	165	1.2
Strain, sprain	2,355	47.6	16,530	24.4	4,495	46.8	2,895	40.8	5,755	40.5
Other	570	11.5	4,880	7.2	1,240	13.0	640	9.0	2,965	20.9
	4,945		67,510		9,600		7,090		14,195	

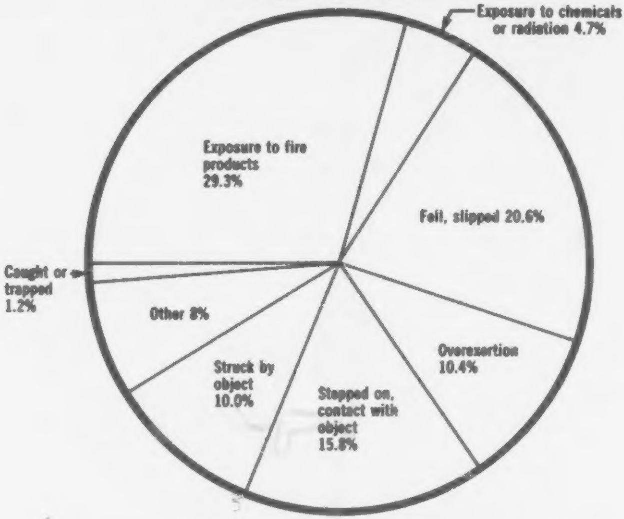
Source: NFPA's Survey of Fire Departments for U.S. Fire Experience (1981).
If a fire fighter sustained multiple injuries for the same incident, only the nature of the single most serious injury was tabulated.

Fire Ground Injuries by Cause (1981)

By nature, the hazardous profession of fire fighting leads to a high occurrence of fire ground injuries, and hence fire ground injuries by cause were examined.

Exposure to fire products was the cause of 29.3 percent of all fire ground injuries. Other major contributors to fire ground injuries were: fell, slipped (20.6 percent); stepped on, contact with object (15.8 percent); overexertion (10.4 percent); and struck by object (10.0 percent). (Cause refers to the initial circumstance leading to the injury.)

Fire ground injuries by cause*



Source: NFPA's Survey of Fire Departments for U.S. Fire Experience (1981)

*Cause refers to the initial circumstance leading to the injury.

Based on 55,259 injuries estimated with data from departments reporting this breakdown.

Average Total Injuries and Average Injuries Requiring Hospitalization per Department by Population Protected (1981)

The average number of injuries per department by population protected is in the second column of the table below. The average ranged from a high of 308.28 injuries for

Average number of fire fighter injuries and injuries requiring hospitalization per department by population of community protected, 1981 (For all types of duty)

Population of community protected	Average number of injuries	Average number of injuries requiring hospitalization	Number of injuries requiring hospitalization per 100 injuries
500,000 to 999,999	308.28	15.00	4.87
250,000 to 499,999	231.60	14.07	6.08
100,000 to 249,999	73.43	5.46	7.44
50,000 to 99,999	28.92	3.25	11.24
25,000 to 49,999	13.55	1.10	8.12
10,000 to 24,999	4.98	.71	14.26
5,000 to 9,999	2.67	.29	10.86
2,500 to 4,999	1.40	.18	12.86
Under 2,500	.51	.08	15.68

Source: NFPA's Survey of Fire Departments for U.S. Fire Experience (1981).

departments that protect communities of 500,000 to 999,999 to a low of .51 injuries for departments that protect communities of less than 2,500 population. Overall, the larger the community protected, the higher the number of fire fighter injuries.

The average number of injuries requiring hospitalization per department by population protected is presented in the third column of the table. For departments that protect communities with populations of 25,000 or more, the average ranged from a high of 15.00 injuries for departments that protect communities of 500,000 to 999,999, to a low of 1.10 injuries for departments that protect communities of 25,000 to 49,999 population. For departments that protect communities of less than 25,000 population, the average number of injuries requiring hospitalization was less than 1 for all groupings.

The number of injuries requiring hospitalization can be related to the total number of injuries that occur for a department. The severity of injuries for departments that protect communities of different sizes can then be compared more directly. The number of injuries requiring hospitalization per 100 injuries by population protected is presented in the fourth column of the table. The hospitalization injury rates ranged from a high of 15.68 for departments that protect communities of less than 2,500 population to a low of 4.87 for departments that protect communities of 500,000 to 999,999, a reversal in position from the average hospitalization injury tabulation. The high rates of injuries that require hospitalization for departments that protect smaller communities may be in part due to the fact that these departments for the most part respond to proportionally (percentage of fire incidents to total incidents) more fires than departments that protect larger communities. Thus, it is important to consider both hospitalization injuries expressed as a proportion of total injuries and average hospitalization injuries when examining results by population protected.

Average Fires and Average Fire Ground Injuries per Department by Population Protected (1981)

These results seem to indicate (1) that the number of fires a fire department responds to is directly related to the population protected, and (2) that the number of fire ground injuries incurred by a department is directly related to its exposure to fire, i.e., the number of fires attended by the department. These points are not surprising. The second point is demonstrated clearly when the range of the statistic is examined: from a high of 307.9 for departments that protect communities of 500,000 to 999,999 population to a low of .4 for departments that protect communities of less than 2,500 population.

Average number of fires, and fire ground injuries per department and injuries per 100 fires by population of community protected

Population of community protected	Average number of fires	Average number of fire ground injuries	Number of fire ground injuries per 100 fires
500,000 to 999,999	7,091.4	307.9	4.3
250,000 to 499,999	4,427.7	162.4	3.7
100,000 to 249,999	1,836.1	43.9	2.4
50,000 to 99,999	754.7	18.0	2.4
25,000 to 49,999	370.6	8.5	2.3
10,000 to 24,999	174.5	3.5	2.0
5,000 to 9,999	78.2	1.9	2.4
2,500 to 4,999	43.7	1.1	2.5
Under 2,500	19.0	.4	2.1

Source: NFPA's Survey of Fire Departments for U.S. Fire Experience (1981).

A useful way to look at fire fighter injury experience and to obtain a reading on the relative risk that departments face is to examine the number of fire ground injuries that occur for every 100 fires. This takes into account relative fire experience and allows more direct comparison between departments that protect communities of different sizes. The number of fire ground injuries per 100 fires is displayed in the fourth column of the table below. The overall range of the rates varied little, from a high of 4.3 fire ground injuries per 100 fires for departments that protect communities of 500,000 to 999,999 population to a low of 2.0 for departments that protect communities of 10,000 to 24,999 population. Thus, the considerable range noted in average fire ground injuries by population protected virtually disappears when relative fire experience is taken into account.

Average Fires and Average Fire Ground Injuries per Department by Population Protected and Region of the Country (1981)

The results for each region of the country shown in the table below indicate that the number of fires a fire department responds to is directly related to the population protected, and that the number of fire ground injuries incurred by a department is directly related to the number of fires experienced. The Northeast reported a substantially higher number of fire ground injuries for departments that protect virtually all community sizes, except for departments that protect communities of 2,500 to 4,999 people.

The table below also shows the number of fire ground injuries per 100 fires by population protected and by region of the country. The Northeast had higher rates than the other regions for departments that protect communities of all sizes. Thus, even when the relatively high fire experience of the Northeast is taken into account, this region still had higher fire ground injury rates than the other regions.

Average number of fires, and fire ground injuries per department, and injuries per 100 fires by population of community protected and region of the country

Column 1: Average reported number of fires
Column 2: Average reported number of fire ground injuries
Column 3: Number of fire ground injuries per 100 fires

Population of	Northeast			Northcentral			South			West		
Community Protected	Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	Col. 3
500,000 to 999,999	—	—	—	—	—	—	7,906.4	326.2	4.1	—	—	—
250,000 to 499,999	7,302.3	517.3	7.1	3,909.3	139.7	3.6	3,938.1	101.9	2.6	4,403.3	87.3	2.0
100,000 to 249,999	3,557.0	133.0	3.7	1,522.0	53.3	3.5	1,857.7	31.9	1.7	1,353.1	22.5	1.7
50,000 to 99,999	1,211.3	47.8	3.9	614.3	14.1	2.3	855.7	12.4	1.5	540.7	10.6	2.0
25,000 to 49,999	553.6	17.1	3.1	318.4	8.9	2.8	401.1	6.7	1.7	298.2	5.1	1.7
10,000 to 24,999	219.1	6.3	2.9	147.9	3.1	2.1	201.0	2.7	1.3	141.6	2.6	1.8
5,000 to 9,999	93.3	3.1	3.3	59.8	1.6	2.7	89.1	1.5	1.7	79.1	1.8	2.3
2,500 to 4,999	41.1	1.3	3.2	35.7	.8	2.2	57.0	1.4	2.5	55.3	1.0	1.8
Under 2,500	18.1	.7	3.9	16.3	.3	1.8	29.7	.5	1.7	16.3	.3	1.8

Source: NFPA's Survey of Fire Departments for U.S. Fire Experience (1981).
Note that for the Northeast, Northcentral and West regions, there was an insufficient number of departments reporting statistics in the 500,000 to 999,999 category.

References

[1] Arthur E. Washburn and David W. Harlow, "United States Fire Fighter Deaths in the Line of Duty During 1977," *Fire Command*, Vol. 45, No. 5 (May 1978) pp. 34-39.

[2] Arthur E. Washburn and David W. Harlow, "United States Fire Fighter Deaths in the Line of Duty During 1978," *Fire Command*, Vol. 46, No. 5 (May 1979) pp. 11-18.

[3] Arthur E. Washburn, David W. Harlow and Sylvia Hom, "United States Fire Fighter Deaths in the Line of Duty During 1979," *Fire Command*, Vol. 47, No. 5 (May 1980) p. 30.

[4] Arthur E. Washburn, David W. Harlow and Sylvia Hom, "1980 United States Fire Fighter Deaths in the Line of Duty," *Fire Command*, Vol. 48, No. 5 (May 1981) p. 12.

[5] Arthur E. Washburn, David W. Harlow and Rita F. Fahy, "United States Fire Fighter Deaths — 1981," *Fire Service Today*, Vol. 49, No. 5 (May 1982), p. 12.

[6] International Association of Fire Fighters," 1979 Annual Death and Injury Survey," *International Fire Fighter*, November 1980.

[7] R. James Barnard, "Heart Disease in Fire Fighters — Parts 1 and 2," *Fire Command*, Vol. 46, Nos. 8,9 (August, September 1979); pp. 52-55, 34-36.

[8] Sylvia Hom, "Breathing apparatus and fire fighter deaths — Parts 1 and 2," *Fire Command*, Vol. 47, Nos. 6,7 (June, July 1980), pp. 24,22. In addition, see "The Role of Breathing Apparatus in Fire Fighter Deaths," by Sylvia Hom, a report submitted to the National Institute for Occupational Safety and Health by the NFPA, March 1980.

[9] According to Dr. R. James Barnard, the stress of fire fighting includes an emotional stress indicated by "extremely high heart rates recorded immediately after the alarm, during the anticipation phase while riding on the truck, and for prolonged periods during actual fire fighting," in addition to thermal stress. "Heart disease in fire fighters — Part 1," *Fire Command*, Vol. 46, No. 8, (August 1979), p. 54.

[10] Michael J. Karter Jr., "Fire fighter injuries in the United States during 1979," *Fire Command*, Vol. 47, No. 12 (December 1980), p. 25.

[11] Michael J. Karter Jr., "U.S. fire fighter injuries — 1980," *Fire Service Today*, Vol. 48, No. 12 (December 1981), p. 16.

[12] Michael J. Karter Jr., "U.S. fire fighter injuries — 1981," *Fire Service Today*, Vol. 49, No. 12 (December 1982).

Additional Reading

"A Study of Occupational Injuries and Illnesses Among Firefighters" prepared by Safety Sciences, Division of Syncor International, San Diego, California, May 1980. Prepared for the Federal Emergency Management Agency, U.S. Fire Administration.

* * * * *

Safety Programs for Fire Fighters

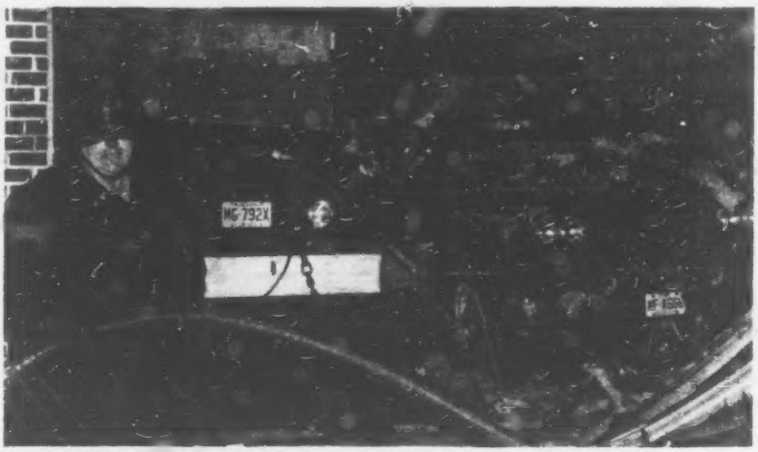
Fire fighting is an inherently dangerous activity. Fire fighter deaths have historically numbered in the hundreds, and injuries in the tens of thousands, annually. Many of these injuries and deaths are needless and could be avoided by adherence to a carefully administered safety program. (See "Fire Fighter Deaths and Injuries" that precedes this article.)

Regardless of the size of the department, the costs associated with the development and implementation of a fire department safety pogram are minimal, particularly when compared to the direct and indirect costs associated with even a single serious injury or death. Fire departments that have identified those costs are able to easily justify the expenditures of funds for safety programs and equipment. Unfortunately, such departments are presently in the minority.

Safety is primarily a management responsibility in any organization, including the fire service. Although the responsibility for fire fighter safety falls upon management, the development and implementation of a program often involves the active participation of personnel at all levels within the organization.

Management should:

- Establish and promote safety policies.
- Assign competent supervision (safety officer).
- Provide an environment free from recognizable hazards.



Seven fire fighters were injured, three seriously, in a fire at the Elwood Fire Station in Atlantic County, NJ. Fire fighters had been draining gasoline from an engine when a mild "puff" occurred. Within seconds, the apparatus room was in flames, in spite of precautionary measures taken. Damage to apparatus and the firehouse was estimated at $84,000 and $110,000, respectively. (Times-Journal, Vineland, NJ.)

- Delegate authority.
- Provide safety training education.
- Investigate accident causes.
- Provide safety inspections.
- Maintain accident records and statistics in accordance with state and federal regulations.
- Provide continuing support for safety programs.

In addition to defining duties, responsibilities, and a general standard of conduct for personnel, a safety program must also address individual accountability for adherence to behavior patterns outlined in the program. This can take the form of incentives for the reduction or lack of accidents, or punitive actions for ignoring or disregarding safety measures.

Individual attitudinal problems that can compound the safety problem are:

- Taking an unsafe position at the fire ground.
- Acting without authority.
- Being absent-minded, impatient, or reckless.
- Being out of shape (physically).
- Failing to use or properly maintain protective equipment.

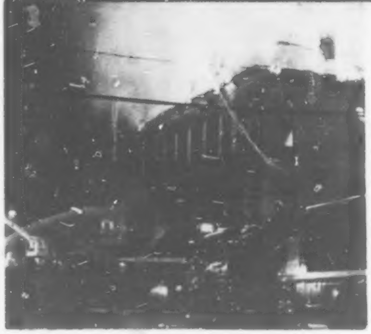
The ultimate success of a safety program results from policy promulgation and attitudinal change. When operating safely becomes an unconscious effort on the part of department personnel, then success has been achieved. All that remains is continual program maintenance and reinforcement.

The environment in which the U.S. fire fighter works varies widely. Although most injuries and deaths occur on or as a result of fire ground activity, routine activity such as vehicle operation, training activities, and station maintenance account for a substantial number of injuries and deaths. In many respects, these activities are more controllable and thus lend themselves to safety techniques used by vehicle fleet programs and industrial safety programs. Fire ground safety, however, represents unique safety problems, where service injuries can only be limited by the implementation of standard operating procedures and effective fire ground management.

1982 . . .
A Closer Look

Christopher J. Naum Photos

NORTH SYRACUSE FIRE DEPT.



Urban fire fighters confronted by two of 1982's hottest fire problems — private dwelling fires and hotel fires. Above, New York City fire fighters battle a 5-alarm blaze in a 7-story tenement that monopolized 45 pieces of apparatus and 140 fire fighters, injuring several. Below, an unattended hot plate caused this 3-alarm fire in a 3½-story hotel located in the North Syracuse, NY area.

Joseph E. Toole Photos

Jay K. Bradish Photo

Above, an early afternoon church fire in Fall River, MA resulted in $15 million estimated accidental damage that destroyed a $1 million restoration project. Middle, in Custer City, PA, over 200 fire fighters poured more than 2,000 gallons of foam on this train derailment. Twenty-four cars were involved, including 12 tank cars carrying crude oil. Below, a grandfather and his two grandchildren died in this mid-morning house fire on Long Island, NY that was fought by volunteers from three fire departments.

Ed Heavey Photo

Larry Ford Photo

Linda Gheen Photo

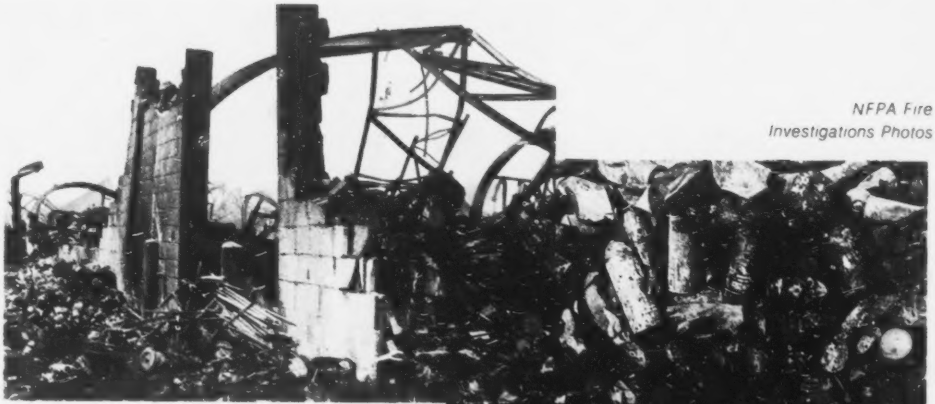
Jay K. Bradish Photo

Larry Ford Photo

On the job, fire fighters venting a fire in a multiple-family dwelling in Los Angeles (above), relieving a dry throat after fighting a Texas house fire (left), confronting a gas well fire in Dayton, NY with mechanical foam (right), and witnessing a fire devil during a training exercise at a State Fire Training School in El Toro, CA (below).

Bill Eisner Photo

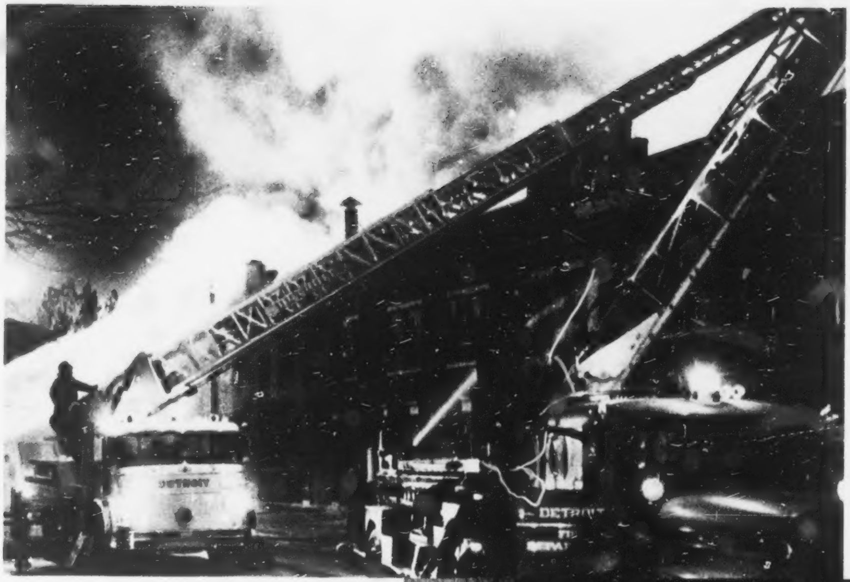
NFPA Fire
Investigations Photos



Two spectacular warehouse fires in 1982. Above, 100 fire fighters from 24 companies fought this blaze for over a week in a Michigan tire warehouse. One of the largest property losses in recent times occurred in K-Mart's East Coast Warehouse and Distribution Center. Shown below are the remains of the more than $100 million loss from the Fairless Hills, PA fire.

Bill Noonan Photos

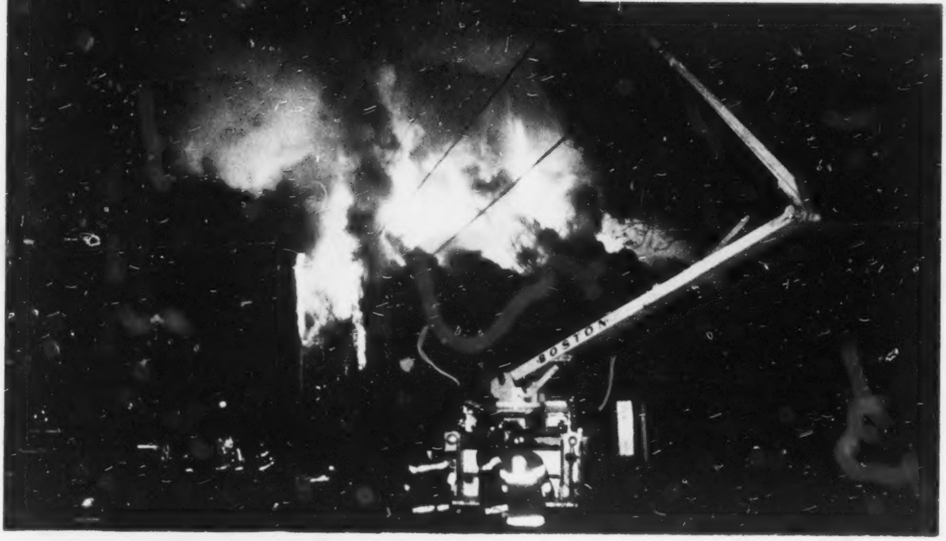
A conflagration in Lynn, MA in November 1981 mobilized over 700 fire fighters from 74 communities. Above, a fire fighter directs his hose at one of the 31 buildings that were involved. Below, fire continues to burn behind remains of recently renovated buildings.



Bill Eisner Photos

Shown here are two of the many set fires in Detroit on Devil's Night (October 30, 1982), that sent fire fighters on 324 fire runs before dawn. Above, fire fighters fight a 4-alarm blaze in a vacant bakery. Below, two engine companies work a fire in an unoccupied house.

Arson



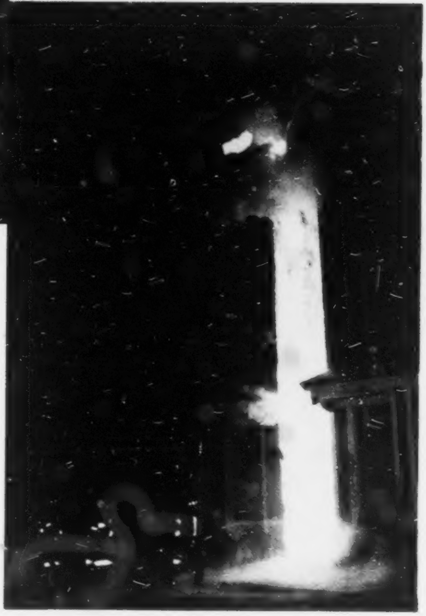
Bill Noonan Photos

Linda Gheen Photo

Arsonists keep fire fighters busy battling set fires in vacant buildings, both old and new, urban and rural.

Boston Burning

Bill Noonan Photos



One of the nation's worst crimes — arson — is especially widespread in urban areas. Boston is no exception, as almost nightly fire fighters respond to incendiary fires throughout the city. Any type of occupancy is fair game for the arsonist's torch: in these cases, a church, a warehouse, and a multiple-family dwelling.

Elements of a Safety Program

Protective Equipment

The safety program should include standards for protective equipment and the appropriate use and maintenance of each piece of personal safety equipment. The concept of protective equipment as a system needs to be emphasized; i.e., protective equipment consists of a variety of components, each of which represents an integral part of a total protection package, and a failure to correctly use all components of the system negates the total protection afforded by a complete protective system. This system must provide complete body protection from the effects of smoke, heat, toxic gases, moisture, puncture, impact, and electrical shock. This level of protection can only be achieved by the proper combination of SCBA, helmet, hood, face shield, turnout coat, trousers, gloves, and boots. Equipment that meets or exceeds current regulations or consensus standards should be used. OSHA regulations (29 CFR 1910.156, Subpart L) and NFPA standards (NFPA 1971, 1972, 1981) for protective equipment provide guidance for selecting equipment that meets the minimum protective requirements for effectively combatting contemporary fire problems.

Fire departments insisting on mandatory use of SCBA and protective clothing that meet current standards have a reduced injury and death rate, as well as a more conducive environment for aggressive fire attack. This protective equipment is usually purchased by the fire department, required to be worn at all times, and maintained in a ready condition by an organized preventive maintenance and replacement program.

Certain safety problems are solved using protective equipment designed for specific hazards. Unusual atmospheres that result from hazardous materials incidents require protection from dangerous vapors that can only be maintained using special chemical suits and SCBA together. Large flammable liquid fires and aircraft incidents may require the special protection provided by reflectorized proximity and/or entry suits. Unusual rescue situations may require special equipment such as life vests, exposure and wet suits, and disposable contamination clothing. Some hazards require the use of specific accessory equipment, for example, the use of linesman gloves and specially designed electrical "hotsticks" for dealing with electrical emergencies.

Accident Investigation and Records

Adequate investigation of an accident provides the basis for medical, insurance, and legal considerations, as well as a method to determine underlying causes for the accident. The results of the investigation can be used to evaluate or improve a fire department safety program. An analysis of accident investigation records can provide a means for tracking both the direct and indirect costs associated with any injuries. Thorough investigation can provide the answers to questions regarding unsafe actions or a breech of safety policies by the accident victim.

All injuries are important and should be documented for both legal and departmental reasons. Accident documentation can serve as a reminder that the potential for injury or death is real, and that all personnel are subject to injury or death when they do not operate in a safe manner or do not adhere to safety regulations. (The NFPA publication, *SCBA, A Guide for the Selection, Use, Care and Maintenance of SCBA* outlines investigative protocols for fire ground respiratory injuries.)

Apparatus Operational Safety

According to General Motors Corporation, untrained drivers cost fire departments five times more money per collision than trained drivers. In addition, fire department vehicles must be equipped with minimum safety equipment as outlined by state and federal regulations, as well as NFPA 1901, *Standard for Automotive Fire Apparatus*.

Apparatus operational safety can be divided into a number of areas: driver/operator training, vehicle maintenance and safety, and personnel safety. Driver/operator safety includes both a thorough knowledge of the legal requirements for the operation of the size and type of apparatus used by the department, and the motor vehicle regulations as they apply to emergency vehicles in the respective state. Minimum training for fire department drivers should include the U.S. Department of Transportation Defensive Driving Course and successful completion of an apparatus rodeo course, that measures the driver's ability to maneuver the vehicle through a series of stations simulating common vehicle movements as well as driver competence. Procedures for backing apparatus in tight quarters or at busy emergency scenes should emphasize driver/observer coordination and personnel safety. Back-up alarms also provide a degree of personnel safety. Driver/operator safety standards are referenced in NFPA 1002, *Standard for Fire Apparatus Driver/Operator Professional Qualifications* and have a direct bearing on apparatus operation safety.

Adequate vehicle design and preventive maintenance is the second area of the apparatus operations safety program. The safety of fire service personnel as well as the civilian population depends on well-maintained and dependable emergency vehicles. The rated gross vehicle weight of apparatus should not be exceeded since overloading adversely affects the braking, stability, and performance of the vehicle.

Drivers should be involved in preventive maintenance programs to insure a working knowledge of the vehicle's components, as well as the ability to recognize and possibly troubleshoot potential maintenance and safety problems.

The third area of apparatus operational safety concerns personnel safety in regard to apparatus operations. Fire fighter injury and death surveys annually report the result of inadequate policies for fire fighter safety while boarding, riding, or disembarking from apparatus. Fire fighters should be seated and confined by seat belts whenever the vehicle is in motion. Where apparatus is not equipped with sufficient seating for personnel, then the numbers of personnel allowed to respond should be limited, or safety harnesses or hardware provided. Many injuries and deaths have also been sustained when personnel attempt to mount a moving vehicle, ride without proper protective equipment, or prematurely leave the vehicle before it has completely stopped. Unfortunately, many of these accidents are not even associated with emergency responses, but are sustained while the vehicle is involved in non-emergency situations.

In-Station Safety

In-station safety is an area where considerable control can be exercised. Because most in-station activity is of a non-emergency nature and some areas of the fire station are similar to areas in industrial or institutional facilities, development of an in-station safety program should be a relatively simple task. In reality, however, many fire stations are poor examples of good firesafety. Since the fire service is a major promoter of safety, each organization should routinely review its own fire and safety status. A safety audit using standard OSHA criteria (see 29 CFR 1910) as well as the community's own firesafety regulations will often reveal a significant number of physical problems, as well as a few poor safety procedures used by fire department personnel. Common areas for concern are: storage and handling of flammables, workshop safety, exit requirements, tripping and storage problems, inadequate electrical equipment, and a lack of built-in fire protection features.

Fire Ground Safety

The vast majority of fire fighter injuries or deaths occur annually on the fire ground or emergency scene. It is ironic that the organization which is called upon to respond and mitigate other's emergencies, does so in such a way that it injures or kills its own personnel at a phenomenal rate. Fire fighting is a dangerous activity, but that danger is often compounded by a lack of concern for, or application of, fire ground safety principles. In general, the fire ground must be managed in a more professional and systematic manner if the fire fighter death and injury rate is to be reduced. Good planning and organization

Fire fighters from Lower Alsace Township, PA direct water into the Alsace Manor Fire Station that was destroyed, along with four of the Station's six apparatus, in an early morning fire. Damage was estimated at $300,000. (*Reading Eagle*, Reading, PA.)

should help ensure that fire fighters perform their tasks safely and efficiently on the fire ground.

Immediately following size-up, the fire ground commander must evaluate the fire, determine what resources are needed to fight it, and call for additional resources if required. Then the commander must develop an organizational structure based on planned operating procedures, and must also implement strategic control measures.

Good communications are necessary for safe and effective fire fighting operations. This means a well-organized dispatch system; two-way radios in each emergency vehicle; battery-powered portable megaphones or vehicle-mounted public address systems; portable two-way radios for individuals; and a messenger system.

Sectoring reduces the number of persons reporting to command. It allows the commander to concentrate on overall strategy, coordinate all fire ground operations, and best allocate resources. Sector officers control the functions assigned to their commands. Sectoring should be considered when several units are operating on the fire ground or when direct control of certain operations is needed. Sectoring should be organized according to an established system. A safety sector should always be created at large working fires or multiple alarms.

A standard personnel identification system should be developed that helps officers account for the location of units and personnel at all times.

Fire departments must be prepared to deal with fatigue at the fire ground. Everyone should learn to recognize the signs of fatigue. If possible, exhausted units should rest and refresh themselves at rehabilitation sectors. When heat, cold, or lengthy operations are factors, personnel should be rotated with fresh and rested crews on a regular basis. Relieved fire fighters should be checked by emergency medical technicians (EMTs) or paramedics. Personnel will suffer less fatigue on the fire ground if they exercise regularly as part of a physical fitness program.

Tactical plans should be developed for unusual situations such as those involving electrical problems, hazardous materials, and ground cover fires. Departments should learn which hazardous materials are found in their communities, collect information and expert advice concerning those materials, and be equipped to deal with them safely. Wind conditions, established escape routes, and proper tactics are especially important in fighting ground cover fires.

A system should be required when fire fighters need to evacuate the involved building or area. This should include an evacuation alert announcement and means of accurately accounting for all personnel once they leave the endangered area. Evacuations can be tactical withdrawals, allowing fire fighters to move equipment to safety, or can occur under conditions so serious that equipment should be abandoned. A fire ground perimeter will help personnel determine where they will be safe.

All the elements of fire ground safety should be practiced during training sessions since simulated fire and rescue situations account for a significant number of fire fighter deaths and injuries annually. Training sessions for fire and emergency situations should be the place to emphasize as well as practice safe operations.

Fire Fighter Health and Fitness

The health and fitness of fire fighters should be the prerequisite for any safety program. The physical condition of individual personnel will have a direct effect on their aerobic capacity, and consequently, on the condition of their hearts and circulatory systems. Since fire fighting is excessively demanding on these body components, a high level of fitness will significantly reduce the chances of cardiovascular problems, an area of growing concern among fire service personnel.

Health maintenance programs aimed at reducing the risk of heart-related as well as other forms of injuries have, unfortunately, been adopted by less than 20 percent of all fire departments. Improved initial medical screening and periodic medical examinations, together with individualized physical fitness training have shown and will continue to show significant reduction in risk potential for serious injury and death. Supplemental educational programs in the area of weight control, nutrition, smoking, and coping with stress will have a collective effect in providing a support mechanism to improve fire fighter safety.

The general good health and fitness of the individual fire fighter will usually have a positive effect on his mental attitude, a factor that can have a positive effect on accident potential Fire fighters who are physically fit are also less likely to sustain serious injuries when involved in accident situations, and are prone to recover faster from injuries.

Establishing a Safety Officer

The safety officer is a significant position in any fire department. The safety officer acts as an overseer of the department safety consciousness and should have direct access to the chief executive officer of the department in regard to recommendations in occupational health and safety matters. NFPA Standard 1501, *Fire Department Safety Officer*, provides minimum duties and responsibilities of the safety officer. He is responsible for recommending and implementing a department safety program designed to: prevent loss of life or injury, identify and correct dangerous practices, assure proper maintenance of equipment, and prevent equipment loss and damage.

The safety officer alone, or acting as the chairman of a safety committee, should make recommendation to eliminate unsafe practices, manage periodic testing of fire fighting and personnel safety equipment, instruct or delegate instruction of personnel in safe work methods and the training and testing of drivers of emergency vehicles, and maintain records and statistical data on all fire department job-related injuries and occupational diseases or fatalities. The safety officer can be the catalyst for a well run safety program. A well-balanced and representative safety committee may provide the forum needed for valuable input as well as orderly implementation.

In an effort to save energy, solar-powered firehouses may be a trend of the future. The solar-powered Station 1 in Dallas, Texas receives heat, hot water, and air conditioning from a range of collectors on its roof.

Resources for Safety Programs

American National Standards Institute (ANSI)
1430 Broadway
New York, NY 10018
ANSI Standard 288.5, Practices for Respiratory Protection for the Fire Service

Department of Transportation
Washington, DC
or State DOT
Defensive Driving Course (8 Hours)

International Association of Fire Fighters
Occupational Health & Safety Division
1750 New York Ave., NW
Washington, DC 20006
Life Support
Line to Safety (AV manual)
Minimum Standards for Fire Fighter Protective Clothing And Equipment
Occupational Cancer and the Fire Fighter
Thermal Stress and the Fire Fighter
Health and Safety Contract Information
Aerial Device Testing and Certification Program (AV program and text)
Occupational Noise and Safety

International Fire Service Training Association
Fire Protection Publications
Oklahoma State University - Fire Building
Stillwater, OK 74078
Books
IFSTA 106, *Fire Apparatus Practices*
IFSTA 209, *Fire Fighter Occupational Safety*

National Fire Protection Association
Batterymarch Park
Quincy, MA 02269

Standards
- NFPA 1002, *Standard for Fire Apparatus Driver/Operator Professional Qualifications*
- NFPA 1501, *Standard for Fire Department Safety Officer*
- NFPA 1901, *Standard for Automotive Fire Appartatus*
- NFPA 1971, *Standard for Protective Clothing for Structural Fire Fighting*
- NFPA 1972, *Standard for Structural Fire Fighter's Helmets*
- NFPA 1981, *Standard for Self-Contained Breathing Apparatus for Fire Fighters*

Books
- *Safety in the Fire Service*, Soros
- *SCBA: A Guide to the Selection, Use, Care and Maintenance of SCBA*, Taele, Greenawalt, Persson
- *Physical Fitness and Public Safety*, Jacobs

Slide/Tape Programs
Fire Fighter Safety Series
- Safety 1: *Danger! Fire Fighter at Work*
- Safety 2: *The Fire Department Safety Program*
- Safety 3: *Organizing the Fire Ground*

Safety 4: *Fire Ground Operations*
Safety 5: *Protective Clothing and Breathing Apparatus*
Safety 6: *The Basic Fire Fighting Machine*
Safety 7: *Emergency Vehicle Operations*
Safety 8: *Structural Collapse*

Fire Command Series
Fire Command 1: *The Fire Command System*
Fire Command 2: *Fire Ground Factors*
Fire Command 3: *Tactical Priorities*
Fire Command 4: *Rescue*
Fire Command 5: *Fire Control: Offensive Attack*
Fire Command 6: *Fire Control: Defensive Attack*
Fire Command 7: *Property Conservation*
Fire Command 8: *Fire Stream Management*
Fire Command 9: *Support Activities*
Fire Command 10: *Staging and Apparatus Placement*
Fire Command 11: *Command Procedures*
Fire Command 12: *Sectoring and Company Functions*
Fire Command 13: *Communications*

Periodicals
"Annual Fire Fighter Death Survey" - May issue: *Fire Service Today*
"Annual Fire Fighter Injury Survey" - December issue: *Fire Service Today*

Posters
Safety Posters: series of 6 safety posters for fire station use

National Safety Council
425 North Michigan Ave.
Chicago, IL 60611

The National Safety Council publishes many safety-related materials: organizing safety programs, supervisor's responsibilities for safety, and safety campaign material. The material is excellent for in-station safety, in particular.

OSHA Office of Publications
Room S1212
U.S. Dept. of Labor
Washington, DC 20210

National Fire Academy
National Emergency Training Center
16925 South Seton Ave.
Emmitsburg, MD 21727

WE WANT TO KNOW . . .
if a name, an address, or a phone number has changed; if there's an upcoming event, a new program or course, a new publication being offered. If you have more current information than is contained in this *Almanac,* know something that should be included in this book, or just have something interesting about the fire protection scene that you want to contribute, please let us know. Write: Editor, *Fire Almanac,* NFPA, Batterymarch Park, Quincy, MA 02269. All suggestions will receive our careful attention.

Federal Benefits for Fire Fighters*

The Public Safety Officers' Benefits Act of 1976 provides a $50,000 federal benefit to the survivors of state and local fire fighters and law enforcement officers who die as the direct or proximate result of personal injury sustained in the line of duty on or after 29 September 1976. From October 1976 through July 1982, the Public Safety Officers' Benefits Program (PSOB) paid 374 claims to eligible beneficiaries of fire fighters. The payments totaled $18,700,000. This article summarizes the PSOB program coverage and eligibility requirements for paid and volunteer fire fighters.

Accidental and Fire-related Coverage

Under the Act, coverage extends to all actions which the paid or volunteer fire fighter is officially assigned to perform. Coverage is not limited to fire-related death, but also includes accidental duty-related death. Benefits have been awarded, for example, in claims arising out of training and community service accidents, such as electrocution while hanging a church banner or a fatal head injury sustained in a fall at the station house.

The Act is not workmen's compensation. Accordingly, there is no employer's responsibility. The benefits will not be paid if a fire fighter's death is a result of suicide, intentional misconduct, or voluntary intoxication. Nor will benefits be paid when a claimant's actions were a substantial contributing factor to the fire fighter's death.

The Act precludes coverage of deaths caused by heart or pulmonary diseases. Because of its importance, this limitation merits complete and detailed explanation.

Cardiac and Pulmonary Coverage

Deaths due to chronic, progressive, or congenital cardiac or pulmonary disease are not covered by the Act, unless a traumatic injury was a substantial factor in the death. "Substantial factor" means that the traumatic injury contributed to the death to as great a degree as any other factor, such as a pre-existing disease. Traumatic injury is defined as: "A wound or other condition of the body caused by external force, including injuries inflicted by bullets, explosives, sharp instruments, blunt objects, or other physical blows, chemicals, electricity, climatic conditions, infectious diseases, radiation, and bacteria, but excluding stress and strain."

The most common traumatic injury suffered by a fire fighter whose death results from a heart or pulmonary condition is carbon monoxide poisoning due to smoke inhalation. Recognizing this, the Office of Justice Assistance Research and Statistics (OJARS) has established a minimum blood carbon monoxide (COhb) level that can be considered a "substantial factor" in a heart or pulmonary disease-related death. Most medical experts consider lethal COhb levels to be at the 30 percent or higher saturation level. After consulting with qualified physicians in the field, however, the OJARS determined that COhb levels of much less than 30 percent can be fatal. The agency, therefore, has set its COhb "substantial factor" standard at 10 percent saturation for nonsmokers and at 15 percent saturation for smokers.

The COhb standards set by the OJARS enhance the potential for coverage of fire fighters who suffer fatal heart or pulmonary attacks at a fire scene, or within a few hours of fighting a fire. There is, however, one important impediment to this enhanced coverage.

Frequently, when a fire fighter dies of a fatal heart or pulmonary attack, medical examiners and coroners will determine the death to be natural. They often fail to order an autopsy or toxicological analysis. The cause of death on the official certificate is then listed as a certain type of heart or pulmonary attack due to heart or pulmonary disease. This places the fire department in the position of attempting to prove that the fire fighter suffered smoke inhalation sufficient for coverage under the Act. Frequently, the only evidence submitted is that there was smoke at the fire. Such a statement cannot be accepted as a basis for coverage.

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* This updated article originally appeared in the January 1979 issue of *Fire Command*, "Federal Benefits for Fire Fighters," William F. Powers, Director, Public Safety Officers' Benefits Program, Office of the Comptroller, Office of Justice Assistance Research and Statistics, U.S. Department of Justice.

Departments must submit medical evidence of smoke inhalation. Accordingly, if a fire fighter dies of a heart or pulmonary condition, a toxicological analysis must be performed to determine the blood level of all toxic fumes, with particular attention to carbon monoxide levels.

Some laboratories will report "CO level less than 10 percent," or no CO level at all. Such generalized statements diminish the potential for coverage under the Act. Fire departments, therefore, should order a toxicological analysis with a specific request that exact toxic levels be listed in the report. If the family approves, an autopsy should also be performed.

Off-Duty Coverage

Fire fighters are also affected by a limitation which requires that death be the result of an act that the fire fighter was obligated or authorized to perform by law, rule, regulation, or condition of employment. This limitation affects the off-duty fire fighter who comes upon a fire or emergency and acts to save life or property. On occasion, off-duty fire fighters take such actions without legal obligation or authority. Thus, they are acting as private citizens and are not covered under the Act.

Paid and volunteer departments can resolve this problem by developing written departmental regulations that specify the obligation and authority of off-duty fire fighters who come upon fires and other emergencies. Such regulations must be consistent with state statutes and local ordinances governing off-duty activities and mutual aid agreements.

Initiating a Claim

A claim can be initiated by calling the Public Safety Officers' Benefits Division of the OJARS at (202) 724-7620. The PSOB staff will supply claim forms and will advise the department of the claim documentation required. Claims may also be initiated by writing to: Public Safety Officers' Benefits Program, Office of the Comptroller, OJARS, 633 Indiana Avenue, NW, Washington, DC 20531. When writing to report a death, the name and telephone number of the department official responsible for handling the claim must be included.

Claim Payment

Benefits checks are mailed directly to eligible survivors. These may include the fire fighter's spouse and children, and, if there are no spouse and children, the dependent parents. A widow, for example, would receive $50,000. If there were two eligible children, the widow would receive $25,000 and each child would receive $12,500. If the fire fighter were single, his dependent parents would be eligible for the benefit. Generally, parents are considered dependent if they had relied on the deceased fire fighter for over one-third of their support. Other factors are also considered in determining dependency.

The PSOB benefit is not subject to federal tax. Moreover, the benefit is not part of the deceased fire fighter's estate, nor is it subject to attachment by creditors.

The majority of claims are paid within two months of the report of the fire fighter's death. If multiple fire fighter deaths occur, PSOB staff will come to the affected jurisdiction to assist with the required claim documentation. Both eligible beneficiaries and the department will be given technical assistance in completing PSOB forms and in making certain that essential documents are properly authorized and legally certified. This on-site assistance will accelerate required procedures and speed benefits payment.

Additional information on the program may be obtained by writing to:

Public Safety Officers' Benefits Program
Office of the Comptroller
OJARS
633 Indiana Avenue, NW
Washington, DC 20531

The Problem of Arson

Arson Law

The need for a new model arson penal law has been the conclusion of many recent studies conducted by public authorities, insurance industry representatives, and research organizations. Without effective laws, neither the fire or police agencies, the prosecutors,

ESTIMATES OF U.S. FIRES DUE TO INCENDIARY AND SUSPICIOUS FIRES IN STRUCTURES (1977-81)

	Number of Fires				
Types of Fires	1977	1978	1979	1980	1981
Structure Fire of Incendiary Origin	86,500	87,000	88,500	92,000	88,000
Structure Fire of Suspicious Origin	81,000	73,000	60,000	54,000	66,500
Total Structure Fire of Incendiary and Suspicious Origin	167,500	160,000	148,500	146,000	154,500

The estimates are based on data reported to the NFPA by fire departments that responded to the NFPA's Annual Survey of Fire Departments for U.S. Fire Experiences (1977-81).

ESTIMATES OF U.S. CIVILIAN DEATHS DUE TO INCENDIARY AND SUSPICIOUS FIRES IN STRUCTURES (1977-81)

	Civilian Deaths				
Types of Fires	1977	1978	1979	1980	1981
Structure Fire of Incendiary Origin	480	520	435	590	555
Structure Fire of Suspicious Origin	155	410	240	180	265
Total Structure Fire of Incendiary and Suspicious Origin	635	930	675	770	820

The estimates are based on data reported to the NFPA by fire departments that responded to the NFPA's Annual Survey of Fire Departments for U.S. Fire Experiences (1977-81).

ESTIMATES OF U.S. PROPERTY LOSS DUE TO INCENDIARY AND SUSPICIOUS FIRES IN STRUCTURES (1977-81)

	Property Loss				
Types of Fires	1977	1978	1979	1980	1981
Structure Fire of Incendiary Origin	$ 636,000,000	$ 650,000,000	$ 787,000,000	$1,158,000,000	$1,142,000,000
Structure Fire of Suspicious Origin	$ 384,000,000	$ 417,000,000	$ 541,000,000	$ 602,000,000	$ 516,000,000
Total Structure Fire of Incendiary and Suspicious Origin	$1,020,000,000	$1,067,000,000	$1,328,000,000	$1,760,000,000	$1,658,000,000

The estimates are based on data reported to the NFPA by fire departments that responded to the NFPA's Annual Survey of Fire Departments for U.S. Fire Experience (1977-81).

Dollar loss figures represent direct property loss only (loss to contents, structure, a vehicle, machinery, vegetation, or anything else involved in a fire), and do not include indirect losses (e.g., business interruption or temporary shelter costs). Dollar loss estimates are based on figures reported by departments for a year, and no adjustments were made for inflation over the five year period.

nor the insurance industry can hope to curtail or control the high and increasing rate of arson within the United States. While complete uniformity of arson laws among the states is an unrealistic goal, a degree of consistency relative to arson and related offenses is certainly desirable and achievable.

The Alliance of American Insurers, American Insurance Association, National Association of Independent Insurers, and Property Loss Research Bureau undertook the development of a new model arson law; one that would be useful as a guide to legislators and other responsible organizations interested in improving arson provisions within their respective state penal codes. The four cooperating insurance organizations represent a large majority of the property-casualty insurers operating within all 50 states.

Research in this area included a study of the variety of laws enacted, the "Model Arson Law" developed by the Fire Marshals Association of North America (FMANA) in 1934, and the Arson Section of the Model Penal Code structured by the American Law Institute (ALI) in 1960.

Features of Model Arson Penal Law

The model arson penal law combines characteristics of FMANA's model arson law and the theory of ALI's law. This model is structured to apply to the basic varieties of intentional burning, to explosions, and to unknown future offenses not yet experienced in the criminal justice system. It provides reasonable punishment for:

- Acts that endanger both life and property.
- Damage to real and personal property by either fire or explosion.
- Damage to an "occupied" building.
- Conspiracy to cause a fire or explosion.
- Damaging or destroying the property of another person.
- Destruction or damage of property to collect insurance proceeds.
- Reckless or negligent use of fire or explosives.
- Making false reports concerning the placement of incendiary explosives devices or other destructive substances.

- Failure to control or report a dangerous fire.
- Attempting to start a fire or cause an explosion.
- Causing or risking a catastrophe and failure to mitigate a catastrophe.
- Possession of explosives or incendiary devices.

Several states have amended their arson laws in accordance with the Model Arson Penal Code. It is recommended that other states evaluate their criminal codes and consider amendments to their existing statutes so that some uniformity would exist among state arson penal codes.

Model Arson Penal Law

K 100.1 Arson and Related Offenses

(1) Aggravated Arson. A person is guilty of aggravated arson, a felony of the first degree, if he starts a fire or causes an explosion, or if he aids, counsels or procures a fire or explosion, with the purpose of:

  (a) destroying or damaging an inhabited building or occupied structure of another; or

  (b) causing, either directly or indirectly, death or bodily injury to any other person.

(2) Arson. A person is guilty of arson, a felony of the second degree, if he starts a fire or causes an explosion, or if he aids, counsels or procures the setting of a fire or causing of an explosion with the purpose of:

  (a) destroying or damaging a building or unoccupied structure of another; or

  (b) destroying or damaging any real or any personal property, whether his own or another's, to collect insurance for such loss.

(3) Reckless Burning or Exploding. A person commits a felony of the third degree if he purposely starts a fire or causes an explosion, or if he aids, counsels or procures a fire or explosion, whether on his own property or another's, and thereby recklessly:

  (a) places another person in danger of death or bodily injury; or

  (b) places a building or structure of another, whether occupied or not, in danger of damage or destruction; or

  (c) places any personal property of another having a value of $______ or more in danger of damage or destruction.

(4) Failure to Control or Report Dangerous Fire. A person who knows that a fire is endangering life or property of another and fails to take reasonable measures to put out or control the fire, when he can do so without substantial risk to himself, or to give a prompt fire alarm, commits a misdemeanor if:

  (a) he knows that he is under an official, contractual or other legal duty to control or combat the fire; or

  (b) the fire was started, albeit lawfully, by him or with his assent, or on property in his custody or control.

(5) Definitions. "Occupied Structure" means any structure, vehicle or place adapted for overnight accommodation of persons, or for carrying on business therein, whether or not a person is actually present.

"Property of Another" means a building or other property, whether real or personal, in which a person other than the offender has an interest which the offender has no authority to defeat or impair, even though the offender may also have an interest in the building or property.

If a building or structure is divided into separately occupied units, any unit not occupied by the offender is an occupied structure of another.

K 100.2 Causing or Risking Catastrophe

(1) Causing Catastrophe. A person who causes a catastrophe by explosion, fire, flood, avalanche, collapse of building, release of poison gas, radioactive material or other harmful or destructive force or substance, or by any other means of causing potentially widespread injury or damage, commits a felony of the second degree if he does so purposely or knowingly, or a felony of the third degree if he does so recklessly.

(2) Risking Catastrophe. A person is guilty of a misdemeanor if he recklessly creates a risk of catastrophe in the employment of fire, explosives or other dangerous means listed in Subsection (1).

(3) Failure to Prevent Catastrophe. A person who knowingly or recklessly fails to take reasonable measures to mitigate a catastrophe commits a misdemeanor if:

- (a) he knows that he is under an official, contractual or other legal duty to take such measures; or
- (b) he did or assented to the act causing or threatening the catastrophe.

K 100.3 Criminal Mischief

(1) Offense Defined. A person is guilty of criminal mischief if he:

- (a) damages or alters any tangible real or personal property of another purposely, recklessly, or by negligence in the employment of fire, explosives, or other dangerous means listed in Section 100.2(1); or
- (b) purposely or recklessly tampers with tangible property of another so as to endanger person(s) or property; or
- (c) purposely or recklessly causes another to suffer pecuniary loss by deception or threat.

(2) Grading. Criminal mischief is a felony of the third degree if the actor purposely causes pecuniary loss in excess of $_____, or a substantial interruption or impairment of public communication, transportation, supply of water, gas or power, or other public service. It is a misdemeanor if the actor purposely causes pecuniary loss in excess of $_____ or a petty misdemeanor if he purposely or recklessly causes pecuniary loss in excess of $_____.

K 100.4 Possession of Explosive or Incendiary Materials or Devices

A person is guilty of a felony of the third degree when he shall possess, manufacture or transport any incendiary or explosive device or material with the intent to use or to provide such device or material to commit any offense described in 100.1(1), (2), and (3).

K 100.5 Attempted Arson

A person is guilty of attempted arson, a felony of the third degree, if he places or distributes any flammable or combustible material, or any gas, radioactive material, or other harmful or destructive material or substance, in an arrangement or preparation with the intent to eventually start a fire or cause an explosion, or to procure the start of a fire or explosion, with the purpose of willfully and maliciously:

- (a) destroying or damaging any building or structure of another whether occupied or not; or
- (b) destroying or damaging any personal property of another having a value of $_____ or more; or
- (c) placing any person in danger of death or bodily harm.

K 100.6 False Reports

A person is guilty of a misdemeanor if he knowingly conveys or causes to be conveyed to any person false information concerning the placement of any incendiary or explosive device or any other destructive substance in any place where persons or property could be endangered.

Arson Reporting-Immunity Legislation

In the opinion of many working in the field of arson reduction, arson reporting-immunity legislation is the keystone to an effective combined effort of the public and private sectors.

One of the problems insurance companies have faced in fighting arson has been the threat of civil suit and potential liability when confidential information about an insured is disclosed to law enforcement authorities. In 1977, the Alliance of American Insurers drafted model legislation entitled, "Arson Reporting-Immunity Bill."

Specifically, the Model Arson Reporting-Immunity Law:

- Allows authorized agencies (defined as state and federal fire marshals, law enforcement officers, insurance commissioners, and prosecuting attorneys) to require that insurance companies release all information concerning a policyholder involved in a fire loss. This information includes history of premium payment and previous claims, as well as investigatory files.
- Requires insurance companies to notify authorized agencies of suspicious fire losses. Such notice constitutes a request for official investigation.
- Grants limited civil and criminal immunity to those insurance companies that provide information under the provisions of this act.
- Provides for the exchange of information between the insurance companies and the authorized agencies, and the exchange of information among authorized agencies.
- Provides for confidentiality of released information.

As of September 1982, 48 states have passed some form of arson reporting-immunity legislation. The laws in twelve of these states reflect all of the important elements of the industry-developed model law. The laws in the other 36 states, however, vary and lack one or more of the sections necessary for effective cooperation. Adoption of all elements of the Model Reporting-Immunity Law is seen as a key element in an effective state program.

The chart which follows provides details on the current status of arson reporting-immunity legislation.

The model legislation on arson reporting-immunity developed by the Alliance of American Insurers is included here so that anti-arson groups can compare this legislation to immunity laws in effect in their jurisdiction.

Arson Reporting Immunity Bill

To enact section ____ of the revised code, providing for certain authorized agencies to request and receive from insurance companies information relating to fire losses; providing for insurance companies to notify authorized agencies of suspicious fire losses such notice to be indicative of a request for an official investigation; providing for immunity to those insurance companies that provide information under the provisions of this act; providing for the exchange of information between the insurance companies and the authorized agencies and the exchange of information between authorized agencies; providing for confidentiality of released information; providing for testimony in matters under litigation and, providing for penalties for violation of the provisions of this act.

Section 1. Definitions

(a) This act shall be known as the Arson Reporting-Immunity Statute.
(b) "Authorized Agencies" shall mean:
    (1) The State Fire Marshal when authorized or charged with the investigation of fires at the place where the fire actually took place;
    (2) The Director of the State Department of Law Enforcement or similar State Director;

School teacher at St. Patrick's Church School in Rodeo, CA looks over remains of a classroom destroyed in an arson fire. Three juveniles who had broken into the school and set fire to papers on a teacher's desk were later arrested with the aid of the WeTip Program. Estimated total loss was $775,000. (San Francisco Chronicle, San Francisco, CA.)

(3) The Prosecuting Attorney responsible for prosecution in the county where the fire occurred;
(4) The District Attorney responsible for prosecution in the county where the fire occurred;
(5) The State's Attorney responsible for the prosecution in the county where the fire occurred;
(6) The State Insurance Supervisory Official;
(7) Local law enforcement agencies, when charged with the responsibility of investigating fires; and solely for the purpose of Section 2(a);
(8) The Federal Bureau of Investigation or any other Federal agency;
(9) The United States Attorney's Office when authorized or charged with investigation or prosecution of the fire in question.

(c) "Relevant" means information having any tendency to make the existence of any fact that is of consequence to the investigation or determination of the issue more probable or less probable than it would be without the evidence. (See F.R. Evid Rule 401.)

(d) Material will be "deemed important," if within the sole discretion of the "authorized agency," such material is requested by that "authorized agency."

(e) "Action," as used in this statute, shall include non-action or the failure to take action.

(f) "Immune," as used in Section 2(e) of this act, shall mean that neither a civil action nor a criminal prosecution may arise from any action taken pursuant to Section 2, 3, or 4 of this act where actual malice on the part of the insurance company or authorized agency against the insured is not present.

(g) As used in this Section, "insurance company" includes the ____________ FAIR Plan.

Section 2. Disclosure of Information

(a) Any authorized agency may, in writing, require the insurance company at interest to release to the requesting agency any or all relevant information or evidence deemed important to the authorized agency which the company may have in its possession, relating to the fire loss in question. Relevant information may include, without limitation herein:
(1) Pertinent insurance policy information relevant to a fire loss under investigation and any application for such a policy;
(2) Policy premium payment records which are available;
(3) History of previous claims made by the insured;
(4) Material relating to the investigation of the loss, including statements of any person, proof of loss, and any other evidence relevant to the investigation.

(b) (1) When an insurance company has reason to believe that a fire loss in which it has an interest may be of other than accidental cause, then, for the purpose of notification and for having such fire loss investigated, the company shall, in

	CIVIL IMMUNITY 1	CRIMINAL IMMUNITY 2	AGENCIES GET INFORMATION WITHOUT SUBPOENA 3	COMPANIES MUST REPORT 4	COMPANIES GET INFORMATION - RECIPROCITY 5	INSURERS NOTIFY ONE AGENCY 6	REQUIRE AUTHORITIES TESTIFY 7	AGENCIES SHARE INFORMATION WITH OTHER AGENCIES 8
ALABAMA *pub. officers & emp. 36-19-40 thru 36-19-44*	X	X	X	X	—	X	X	—
ALASKA *Insurance code § 21.89.050*	X	X	X	X	X	X	—	X
ARIZONA *Ins. code §§ 20-1901 thru 20-1907*	X	X	X	X	—	X	X	X
ARKANSAS *§ 66-5601 thru 5605*	X	X	X	X	—	X	—	X
CALIFORNIA *Ins. code §§ 1878 thru 1878.5*	X	—	X	X	X	X	—	X
COLORADO *Ins. code §§ 10-4-1001 thru 10-4-1006*	X*		X	X	—	X	X	X
CONNECTICUT *Ins. code § 38-114h (a)-(g)*	X	X	4*	X	X	X	X	X
DELAWARE *Chapter 68, Title 16, §§ 6810-6814*	X	X	X	X	X	X	X	X
DISTRICT OF COLUMBIA								
FLORIDA *Ins. code § 633.175 (1)-(7)*	X	X	X	X	—	X	X	X
GEORGIA *Public Safety § 92A-734.1 (a)-(g)*	X	X	X	X	X	X	X	X
HAWAII *Fire Protection § 132-4.5 (a)-(e)*	X	X	4*	X	X	X	X	—
IDAHO *Chap. 2, Title 41, Sec. 41-270 thru 41-274*	X	X	X	X	X	X	X	X
ILLINOIS *Ins. code 73 § 1153 (a)-(h)*	X	X	4*	X	3*	—	X	—
INDIANA *Ins. code §§ 27-2-13-1 thru 27-2-13-4*	X	X	X	X	X	X	—	X
IOWA *St. Fire Marshal chap 100A (1) thru (6)*	X	X	X	X	X	—	X	X
KANSAS *Kansas Stat. Ann 31-401*	X	—	X	X	X	X	X	X
KENTUCKY *Ins. Code 304.22-150 thru 190 & 304.99 - 080*	X	X	4*	X	X	X	X	X
LOUISIANA *Public Health & Safety 40§ 1568.2*	X	X	X	X	—	X	X	—
MAINE *25 § 2411 thru 2413*	X	X	X	X	X	X	X	X
MARYLAND *article 38.A, §§ 56-57*	X	X	X	X	—	—	—	—
MASSACHUSETTS *chap. 148 Sec. 32*	X	X	X	X	X	X	X	X
MICHIGAN *St. Fire Marshal § 29.4 (1)-(8)*	X	X	X	X	—	X	X	—
MINNESOTA *St. Fire Marshal §§ 299F.052 thru 299F.057*	X	X	X	X	—	X	—	X
MISSISSIPPI *Code An. 1972, Sec 83-13-21 (Supp. 1981)*	X	—	X	—	—	—	—	—
MISSOURI *Ins. Code Chap. 379.176 thru 179*	X	X	X	X	—	X	—	X

This two page chart was developed by the All Industry Research Advisory Council (AIRAC) to aid in tracking the status of arson reporting - immunity legislation.

Courtesy: Insurance Committee for Arson Control

WE WANT TO KNOW . . .

if a name, an address, or a phone number has changed; if there's an upcoming event, a new program or course, a new publication being offered. If you have more current information than is contained in this *Almanac,* know something that should be included in this book, or just have something interesting about the fire protection scene that you want to contribute, please let us know. Write: Editor, *Fire Almanac,* NFPA, Batterymarch Park, Quincy, MA 02269. All suggestions will receive our careful attention.

	CIVIL IMMUNITY 1	CRIMINAL IMMUNITY 2	AGENCIES GET INFORMATION WITHOUT SUBPOENA 3	COMPANIES MUST REPORT 4	COMPANIES GET INFORMATION. RECIPROCITY 5	INSURERS NOTIFY ONE AGENCY 6	REQUIRE AUTHORITIES TESTIFY 7	AGENCIES SHARE INFORMATION WITH OTHER AGENCIES 8
MONTANA *Title 50, ch. 63, Part IV*	X	—	X	X	—	X	X	X
NEBRASKA *81-5, 115 et seq*	X	X	X	X	X	X	X	X
NEVADA								
NEW HAMPSHIRE *Public Safety & Welfare §§ 153:13 thru 153:13a*	X	X	X	X	X	X	X	X
NEW JERSEY *Chap. 17:36-14 thru 21*	X	—	X	X	X	X	X	X
NEW MEXICO *Torts §§ 41-8-1 thru 41-8-6*	X	X	X	X	X	X	—	X
NEW YORK *Ins. Laws § 336 (1) - (6)*	X	X	X	X	3*	X	X	X
NORTH CAROLINA *Fire Pro. § 69-7.1(a) - (e)*	X	X	X	X	—	X	X	—
NORTH DAKOTA *Fires § 18-01-05.1*	X	X	X	2*	X	X	—	—
OHIO *Fire Marshal § 3737-16*	X	X	4*	X	X	X	X	—
OKLAHOMA *Ins. 36 §§ 6301 thru 6306*	X	X	X	X	3*	X	X	X
OREGON *ORS476.090 and 270 and 731.418*	X	X	X	X	—	X	—	—
PENNSYLVANIA *1980 P.L.340 (#85)*	X	X	X	X	X	X	—	X
RHODE ISLAND *Ins..§§ 27-8.1-2 and 27-8.1-3*	X	X	X	X	X	X	X	X
SOUTH CAROLINA								
SOUTH DAKOTA *Ch. 3432A§3432A(1) thru (10)*	X	X	X	X	X	X	X	X
TENNESSEE *Health & Safety § 53-2415 (a) - (g)*	X	X	X	X	X	—	X	X
TEXAS *Ins. Code Art. 5.45 thru 5.46*	X	X	X	—	—	—	X	—
UTAH *St. Affairs in Genl § 63-29-24*	X	X	X	X	—	X	—	—
VERMONT *8 V.S.A., chap. 101 subchapter 12A, §3671 thru 3673*	X	—	X	X	—	X	—	—
VIRGINIA *Fire Protection § 27-85.3 et seq*	X	X	X	X	X	X	—	X
WASHINGTON *Insurance § 48.80.1 et seq*	X	X	X	X	X	X	X	X
WEST VIRGINIA *Misc B. & O. § 29-3-11 thru 29-3-12a*	X*		X	X	—	X	X	—
WISCONSIN *Police Reg. § 165.55 (14)*	X	X	X	2*	X	—	—	—
WYOMING *stat 6-7-111 thru 6-7-113*	X	X	X	X	X	X	—	X
PUERTO RICO								

* grants limited immunity, but does not use the terms criminal or civil

2 * does not require insurance companies to report suspicious claims but states that the y''may report''

3 * provides that insurance companies may ask agencies for information but does not specifically state that release of the information by the agencies is mandatory.

4 * When investigating cases of ''potential'' arson, agencies may request information from insurers

writing, notify an authorized agency and provide it with any or all material developed from the company's inquiry into the fire loss.

(2) When an insurance company provides any one of the authorized agencies with notice of a fire loss, it shall be sufficient notice for the purpose of this act.

(3) Nothing in Section 2(b) of this act shall abrogate or impair the rights or powers created under Section 2(a) of this act.

(c) The authorized agency provided with information pursuant to Section 2(a) or 2(b) of this act and in furtherance of its own purposes, may release or provide such information to any of the other authorized agencies.

(d) Any insurance company providing information to an authorized agency or agencies pursuant to Section 2(a) or 2(b) of this act shall have the right to request relevant information and receive, within a reasonable time, not to exceed 30 days, the information requested.

(e) Any insurance company, or person acting in its behalf; or authorized agency who releases information, whether oral or written, pursuant to Section 2 of this act shall be immune from any liability arising out of a civil action, or, penalty resulting from a criminal prosecution.

Section 3. Evidence.

(a) Any authorized agency and insurance company described in Section 1 or 2 of this act that receives any information furnished pursuant to this act, shall hold the information in confidence and not release the information except to another authorized agency, until such time as its release is required pursuant to a criminal or civil proceeding.

(b) Any authorized agency referred to in Section 1 of this act, or their personnel, may be required to testify in any litigation in which the insurance company at interest is named as a party.

[NOTE: Sections 4(a), (b) and (c) are optional and not required.]

Section 4. Enforcement.

(a) No person or agency shall intentionally or knowingly refuse to release any information requested pursuant to Section 2(a) or 2(c) of this act.

(b) No person shall intentionally or knowingly refuse to provide authorized agencies relevant information pursuant to Section 2(b) of this act.

(c) No person shall fail to hold in confidence information required to be held in confidence by Section 3 of this act.

(d) Whoever violates Section 4(a), 4(b), or 4(c) of this act is guilty of a _____ misdemeanor, and upon conviction, shall be punished by a fine not to exceed $_____.

Section 5. Home Rule and Common Law.

(a) The provisions of this act shall not be construed to affect or repeal any ordinance of any municipality relating to fire prevention or the control of arson, but the jurisdiction of the State Fire Marshal and the Director of the State Department of Law Enforcement (or other similar State Police Director) in such municipality is to be concurrent with that of the municipal and county authorities.

(b) With the exception of Section 1(f), all other provisions of this act shall not be construed to impair any existing statutory or common law rights or powers.

Emergency Medical Service

Emergency Medical Services and Technicians (EMS and EMTs)

During the last two decades, the terms EMS and EMT have become commonly used acronyms in the fire service. Television medical programs have done much to advance our awareness of these terms, their meanings, and importance. Emergency Medical Service (EMS) and Emergency Medical Technician (EMT) generally refer, respectively, to the organization and individual rendering first aid and emergency medical care to sick and injured people before and during transport to a hospital.

Relationship to Fire Service

Historically, the fire service — including volunteer rescue/ambulance squads — has been one of the primary providers of emergency medical care in the United States. The number of fire departments providing this service has increased dramatically in recent years and is still growing.

Beginning in the late 1960s, when the federal government became seriously involved in local pre-hospital emergency care and transportation programs, national standards for emergency medical services improved. Passage of the EMS Systems Act of 1973 (Public Law 93-154), gave substance to government efforts so that by 1980, an estimated 300,000 fire fighters had earned EMT certification.

Standards for pre-hospital care have always been set by the medical community, which helps fire departments keep abreast of significant improvements in emergency procedures. Such developments in recent years have included cardiopulmonary resuscitation, new devices and techniques for management of spinal cord injury, pneumatic counterpressure devices for dealing with shock, improved airway maintenance equipment, mechanical CPR adjuncts, and designated trauma centers.

In the comprehensive book *Emergency Medical Services**, EMS expert James O. Page describes four "profiles" of a fire department's EMS operation or component which he has developed on the basis of national experience. These four basic profiles, with a listing of significant features of each, are:

Basic Life Support Service

1. At least one fire fighter or officer assigned to each fire company trained and certified as an Emergency Medical Technician. Preferable if all personnel are trained and certified to EMT level (basic level).
2. Standard departmental dispatch procedures call for dispatch of nearest fire company to scene of medical emergency in all cases unless there is an ambulance or Mobile Intensive Care Unit closer to the scene. In cases of certain medical malfunctions (cardiac arrest, psychiatric emergency, severe trauma, person trapped, multiple injuries), both engine company and ambulance (or Mobile Intensive Care Unit) are dispatched simultaneously.
3. Fire company personnel perform basic life support services until arrival of ambulance or Mobile Intensive Care Unit. Where necessary, fire company remains at scene to assist ambulance or paramedic personnel.
4. Departmental priorities place a higher regard for life-threatening medical emergencies than for property-damage fires. Fire companies which are committed to a medical emergency are not dispatched to property-damage fires until the medical emergency is resolved and the company is made available by the company officer.
5. Departmental dispatching procedures call for "move-ups" or other company coverage arrangements to provide adequate fire protection where fire companies are out-of-service for significant periods of time in connection with medical emergencies.
6. Basic life support service is likely to be most effective if large numbers of citizens are trained in CPR (cardiopulmonary resuscitation).

Advanced Life Support (Paramedic) Service
(Pre-hospital Definitive Care and Stabilization)

1. Service may be designed and equipped for transporting (ambulance) function or for mobile intensive care service without transportation responsibility.
2. Although a few systems use civilian employees of the fire department as Mobile Intensive Care Unit "paramedics," most utilize fire fighters trained to this advanced

**Emergency Medical Services* by James O. Page. Second Edition, 1978. Published by the National Fire Protection Association, Quincy, MA. Mr. Page is a Batt. Chief (Retired), Los Angeles County Fire Department, and Executive Director of the ACT Foundation, Basking Ridge, NJ.

level.

3. Advanced Life Support will be most effective in cases of life-threatening medical emergencies where it is part of a system which also includes basic life support service (including a citizen CPR training program).
4. In profiles where the Mobile Intensive Care Unit is non-transporting, and the ambulance service does not include the mobile intensive care service, there will be a need for M.I.C.U. follow-up to hospitals (with at least one of the paramedic fire fighters accompanying the patient in the ambulance) in certain cases.
5. Even where a fire department provides personnel for an advanced life support system, the system must be recognized as a hospital-oriented component and the personnel must function with close ties to their resource hospital.

Emergency Ambulance Service

1. Depending on local and state law, personnel may be either ambulance attendants (Red Cross First Aid and Emergency Care trained) or Emergency Medical Technicians (trained in an approved EMT training program consisting of at least 71 hours of classroom instruction and 10 hours of clinical experience).
2. Through public education and field evaluation, there is an attempt to restrict service to true emergencies. Non-emergency ambulance service (such as convalescent transports) is referred to either private ambulance services or another public service.
3. Although a few systems use civilian employees of the fire department as EMTs (or attendant-drivers), most use fire fighters who are either specifically and permanently assigned to emergency ambulance duty, or who rotate or take turns at such duty.

Emergency and Non-Emergency Ambulance Service

Note: The significant features are basically the same as with Emergency Ambulance Service except that no effort is made to distinguish between the emergency and non-emergency case (unless there is an effort to determine the need for urgency in cases of true emergency). A decision to provide non-emergency ambulance service should be made with the understanding that the service probably will be subject to public abuse, and that vehicular and personnel requirements may be doubled or tripled over the requirements for strictly emergency ambulance service.

EMT Training Courses

EMTs must learn basic life support skills through a well-conducted course supplemented by supervised experience and testing. The trend is toward providing advanced-level pre-hospital care, usually called paramedic service. Other necessary components of a good EMS system include training of dispatch personnel, coordination with hospital emergency room personnel, and cooperation with the general medical community.

In the late 1970s, a 56-hour videotape program and workbook were developed as an EMT training package by the International Association of Fire Chiefs and the International Association of Fire Fighters. This package was part of apprenticeship programs for the one-year EMT-A (for ambulance) certification and the two-year certification as an EMT-P (paramedic). More recently, additional EMT ratings have been developed on a state-by-state basis. Generally, depending on various state regulations, there are now these four levels: the basic level, EMT-A (ambulance); EMT-I (intermediate); EMT-C (cardiac); and EMT-P (paramedic, the highest level). Both programs emphasize the need for on-the-job experience and supervision as well as continuing education in emergency medicine.

Basic courses and standards for EMTs have been approved by the U.S. Department of Transportation's (DOT) National Highway Transportation Safety Administration. The following is a summary of the National Training Course, "Emergency Medical Services — Paramedic," developed by DOT.

Course Description

This training course is organized to provide the student with knowledge about the acute, critical differences in physiology, pathophysiology, or clinical symptoms, as they pertain to the prehospital emergency medical care, of the infant, child, adolescent, adult, and geriatric patient. Students must have an opportunity to acquire clinical experience and practice skills related to the emergency medical care of these patients.

The course consists of three components: didactic, clinical (in-hospital), and field internship. The time required to complete each component will depend on the ability of each student to successfully demonstrate completion of stated objectives through an examination of knowledge and skills.

The course is designed to support the following instructional design:

- Didactic: Lectures, discussions and demonstrations presented by physicians and others competent in the field.
- Clinical: Instruction and supervised practice of emergency medical skills in critical care units, emergency departments, obstetric units and operating rooms (including anesthesia), and psychological crisis intervention centers.
- Field Internship—Critical Evaluation of On-The-Job Performance: Experience as an extra person in a student capacity on an intensive care vehicle (ambulance). This unit shall have telecommunication with medical command authority and equipment and drugs necessary for advanced life support. The student must be supervised by a physician or nurse qualified in emergency medicine or a state or nationally certified EMT-Paramedic. This applied practice component of the education should also occur within an emergency medical care system that delivers paramedic care under medical direction, has biomedical telecommunications, all necessary drugs and equipment, an adequate evaluation system to insure quality in care provided, and a well-defined program of continuing education for its personnel.

Facts and Figures

Early in 1982, it was estimated that there were slightly more than 300 EMS regions throughout the U.S., nearly all of which had received some federal financial assistance. A survey in October 1981 of all state health departments by the *Journal of Emergency Medical Services* (*JEMS*) revealed that there are 485,000 licensed EMTs (basic, intermediate, and advanced). (An earlier study by *JEMS* estimated that in 1980 the number of patients treated and/or transported by EMS personnel totaled 11,637,000.)

In 1981, *JEMS* undertook a limited survey of salaries of career EMS personnel and published the results in the January 1982 issue. Some of the findings are listed below. As *JEMS* points out, this survey does not cover "compensation other than the paycheck," such as paid vacations, holidays, health benefits, life insurance, paid sick days, overtime, etc.

EMT starting salaries (Sample size 125) high $32,800; low $8,000; mean $20,000; average $12,604.

EMT maximum salaries (Sample size 111) high $44,900; low $9,540; mean $27,220; average $16,394.

Average time for EMTs to reach their maximum salaries (sample size 89) shortest time 5 years; longest time 27 years; mean 13.75 years; average 4.4 years.

EMT-P starting salaries (Sample size 107) high $24,700; low $8,000; mean $16,350; average $16,407.

EMT-P maximum salaries (Sample size 108) high $37,900; low $8,000; mean $22,950; average $19,396.

Average time for EMT-Ps to reach maximum salaries (Sample size 85) longest time 27 years; shortest time 5 years; mean 13.75 years; average 5.06 years.

Supervisor starting salaries (Sample size 105) high $44,900; low $8,000; mean $26,450; average $18,943.

Supervisor maximum salaries (Sample size 90) high $59,900, low $13,000; mean $36,450; average $24,826.

Average time for supervisors to reach maximum salaries (Sample size 65) longest time 27 years; shortest time 1 year; mean 14 years; average 5.19 years.

New approaches to emergency medical services are being constantly developed in this rapidly changing field. One new concept is the "public utility model" under which EMS activities are carried out by an organization modeled on a privately owned public utility set-up. Other new approaches are bound to emerge as the field grows and experience broadens.

LEGISLATION AFFECTING EMS

Federal legislation governing the delivery of Emergency Medical Services (EMS) is titled "Emergency Medical Systems Act of 1973" (Public Law 93-154), passed by Congress November 16, 1973. An amendment to Title XII of the Public Health Service Act, this legislation was enacted "to provide assistance and encouragement for the development of comprehensive area emergency medical services systems," as the opening paragraph of the Act stated.

In 1976, Congress passed H.R. 12664 to revise and extend provisions of the original legislation. Specific funding for EMS ceased with the passage of the Omnibus Act of 1981. Instead, Congress included EMS support in a block grant to the states. As a result, the EMS community must convince state and local governments of the importance of EMS as an essential and integral part of the health services delivery system.

Through the National Highway, Traffic and Safety Administration, there are some funds for purchase of ambulances for EMS use. There is also some money for preventive work available through the National Center for Disease Control.

Up to now, lack of funding under the EMS Act does not appear to have had an impact on EMS activities. When the Act was in effect, funding averaged 14 cents per capita; the latest study by the ACT Foundation puts the amount at 24 cents per capita.

EMS Program Profiles

The following list of EMS programs contains names and addresses of people who may be contacted for information about planning, implementing, designing, re-designing, and/or evaluating fire service EMS programs.

These names and addresses are organized by profile, and within each profile there are many variations. Services classified as operating in nontransporting profiles may either use transporting or nontransporting vehicles. Profile determinations were made according to whether transportation is routinely provided or not. Listing a profile as using engine or truck companies as first response does not mean that all calls have such a response.

These profiles were compiled using answers to an Advanced Coronary Treatment (ACT) Foundation survey. The survey was verified by letter from each state EMS director. The survey was published by the Federal Emergency Management Agency (FEMA) in its Fire Service Program Management Guide (1980).

The following definitions are helpful in understanding the profiles.

First Responder:

(1) Level of training:
- D.O.T. course entitled "First Responder" or
- Crash Injury Management, or
- Red Cross Advanced First Aid and Emergency Care and CPR, or
- Some equivalent.

(2) Response role:

- First unit dispatched and/or at the scene. Can be any level of training.

EMT: Basic Life Support emergency care not involving invasive techniques.

Paramedic: Advanced life support emergency care using invasive techniques and other medical techniques under direction of a doctor. For purposes of this survey, it includes intermediate training levels and presupposes certification as an EMT before becoming a paramedic.

Career: Full-time, paid personnel.

Volunteer: Either non-paid personnel or on-call personnel (paid by call).

Civilian: Non-suppression EMS personnel within the fire department. May include sworn members of the fire department—neither trained nor serving as fire fighters.

Dual-Role, Cross-Trained: Fully qualified fire fighters serving in an EMS role after completion of a period of service as fire fighters. Responding both to fires and EMS calls.

Profile 1:

1. Dual-role, cross-trained
2. Career fire fighters serving as
3. EMTs on
4. Nontransporting vehicles
5. With engine or truck company first response.

Battalion Chief Gerald A. Rainsbarger
Riverside City Fire Dept.
3900 Main St.
Riverside, CA 92522
714-787-7328
Pop.: 167,600
72.8 sq. mi.

Assistant Chief Roger Phillips
San Diego Fire Dept.
4206 Chamoune Ave.
San Diego, CA 921045
619-236-6475

Chief Harold Lamphere, Jr.
Norwich Fire Dept.
24 Chestnut St.
Norwich, CT 06360
203-889-2611 (occasional transport)
Pop.: 44,000
29.23 sq. mi.

Chief Gary L. Nichols
Sedgwick County Fire Dept.
4343 N. Woodlawn
Wichita, KS 67220
315-744-0471
Pop.: 65,000
630 sq. mi.

Chief L. Bellamy
Bowling Green Fire Dept.
325 E. 10th Street, Fire Headquarters
Bowling Green, KY 42101
502-843-8921
Pop.: 45,000
28 sq. mi.

Robert N. Mood, EMS Coordinator
Quincy Fire Dept.
40 Quincy Ave.
Quincy, MA 02169
617-471-7309 (occasional transport)
Pop.: 97,000
16.77 sq. mi.

Deputy Chief E. Ring
Minneapolis Fire Dept.
Room 230, City Hall
Minneapolis, MN 55415
612-348-2626
Pop.: 380,000
59 sq. mi.

B. K. Walsh, Training Officer
Missoula Fire Dept.
200 W. Pine St.
Missoula, MT 59801
406-721-2291
Pop.: 40,000
14 sq. mi.

Roger Chapp, Chief of Training
Lincoln Fire Dept.
1801 Q St.
Lincoln, NE 68508
402-474-6181
Pop.: 180,000
55 sq. mi.

Deputy Chief Charles Swody
Elizabeth Fire Dept.
316 Irvington Ave.
Elizabeth, NJ 07208
201-352-9600 (occasional transport)
Pop.: 112,000
11.7 sq. mi.

Chief Frank Stefanelli
Jamestown Fire Dept.
Municipal Building
Jamestown, NY 14701

Captain James E. Farrell
North Tonawanda Fire Dept.
495 Zimmerman St.
North Tonawanda, NY 14120
716-693-2341
Pop.: 40,000
10 sq. mi.

Chief Richard S. Smith
Yonkers Fire Dept.
7 New School St.
Yonkers, NY 10701
914-963-1537
Pop.: 204,000
21 sq. mi.

District Chief Robert J. Ellison
Charlotte Fire Dept.
125 S. Davidson St.
Charlotte, NC 28202
704-374-2881
Pop.: 333,000
137.9 sq. mi.

Harold D. Jones, EMS Manager
Raleigh Fire Department
220 S. Dawson St.
Raleigh, NC 27601
919-755-6395
Pop.: 150,000
45 sq. mi.

Everett Brewer
Enid Fire Dept.
215 S. Independence
Enid, OK 73701
405-234-0400 ext. 265
Pop.: 60,000
80 sq. mi.

Battalion Chief Wilbur Strait
Ashland Fire Dept.
455 Siskiyou Blvd.
Ashland, OR 97520
503-482-1393 (capable of transport)
Pop.: 16,000
75 sq. mi.

Pat Masur, EMS Coordinator
Sioux Falls Fire Dept.
100 S. Minnesota
Sioux Falls, SD 57102
605-339-7173
Pop.: 80,000
45 sq. mi.

Profile 2:

1. Dual-role, cross-trained
2. Career fire fighters serving as
3. Paramedics on
4. Nontransporting vehicles
5. With engine or truck company first response.

Captain Donald A. Wear
Birmingham Fire and Rescue Service Dept.
1807 7th Ave., N.
Birmingham, AL 35203
205-323-8304
Pop.: 265,000
100 sq. mi.

Lieutenant F. D. Sims
Mobile Fire Dept.
701 St. Francis St.
Mobile, AL 36602
205-438-7351
Pop.: 200,000
142 sq. mi.

Captain Robert G. Ward
Lake Havasu City Fire Dept.
145 N. Lake Havasu Ave.
Lake Havasu City, AZ 86403
602-855-1141
Pop.: 17,000
40 sq. mi.

Division Chief O. W. Powell
Phoenix Fire Dept.
1130 N. 1st St.
Phoenix, AZ 85004
602-262-6977
Pop.: 800,000
235 sq. mi.

Captain S. L. Guyer
Hawthorne Fire Dept.
4475 W. El Segundo Blvd.
Hawthorne, CA 90250
213-970-7967
Pop.: 56,000
5.5 sq. mi.

Captain James P. Schwieder
Aurora Fire Dept.
1470 S. Havana St.
Aurora, CO 80012
303-750-5000 ext. 460
Pop.: 168,000
60 sq. mi.

Thomas C. Eisehut, EMS Coordinator
Daytona Beach Fire Dept.
P.O. Box 906
Daytona Beach, FL 32015
904-258-3184
Pop.: 51,000 (500,000 seasonal)
26 sq. mi.

Assistant Chief M. K. Kelly
Orlando Fire Dept.
P.O. Box 2846
Orlando, FL 32802
305-849-2135 (capable of transport)
Pop.: 120,000
44 sq. mi.

District Chief J. D. Colson
Montgomery Fire Dept.
Rescue Service
P.O. Box 1111
City Hall
Montgomery, AL 36104

Lieutenant J. Steven Howard
Kalamazoo Fire Dept.
116 W. Cedar St.
Kalamazoo, MI 49007
616-385-8182
Pop.: 85,555
24.95 sq. mi.

Sergeant Edwin DeLoney
Southfield Fire Dept.
24477 Lahser Rd.
Southfield, MI 48034
313-354-4403
Pop.: 90,000
28.6 sq. mi.

Lieutenant Joseph Fahd
Albany Fire Dept.
Public Safety Building
Albany, NY 12202
518-463-1234
Pop.: 123,000
26.1 sq. mi.

Captain Thomas Toohey, Jr.
Schenectady Fire Dept.
155 Erie Blvd.
Schenectady, NY 12305
518-382-5141
Pop.: 75,000
10.4 sq. mi.

Deputy Chief Thomas R. Haugstad
Everett Fire Dept.
2801 Dakes
Everett, WA 98201
206-259-8840
Pop.: 55,000
39 sq. mi.

Profile 3:

1. Dual-role, cross-trained
2. Career fire fighters serving as
3. First responders.

Captain Phillip Bode
Cedar Rapids Fire Dept.
427 - 1st St. SE
Cedar Rapids, IA 52401
319-398-5342
Pop.: 118,000
52 sq. mi.

Chief Robert P. Keating
Office of the Fire Chief
Civic Center
410 E. Washington St.
Iowa City, IA 52240
319-354-1800
Pop.: 50,000
25 sq. mi.

Chief P. N. Ball
Asheville Fire Dept.
P.O. Box 7148
Asheville, NC 28807
704-255-5334
Pop.: 63,000
30 sq. mi.

Chief Richard Baron
Rutland Fire Dept.
Rutland, VT 05701
802-773-2193
Pop.: 35,000
100 sq. mi.

Assistant Chief Rich Stone
Training Officer

Cheyenne Fire Dept.
Suite 307
2101 O'Neil Ave.
Cheyenne, WY 82001
307-637-6313
Pop.: 50,000
24 sq. mi.

Profile 4:

1. Dual-role, cross-trained
2. Career fire fighters serving as
3. EMTs on
4. Transporting ambulance vehicles
5. With engine or truck company first response.

Lieutenant Jack Rosano, EMS Director
Berkeley Fire Dept.
2121 McKinley Ave.
Berkeley, CA 94703
415-644-6153
Pop.: 120,000
10 sq. mi.

Captain L. Taggart
La Grange Fire Dept.
300 W. Burlington Ave.
La Grange, IL 60525
312-479-2338
Pop.: 18,500
2.5 sq. mi.

Chief Gary L. Thomas
Clinton Fire Dept.
Central Fire Station
334 - 3rd Ave., S.
Clinton, IA 52732
319-242-0125
Pop.: 35,000
33 sq. mi.

Jon W. Campbell
Jackson Fire Dept.
555 Southwest St.
Jackson, MS 39205
601-960-2013
Pop.: 400,000
102 sq. mi.

Deputy Chief Robert E. Wallingford
Laconia Fire Dept.
848 N. Main St.
Laconia, NH 03246
603-524-6881
Pop.: 17,000
27 sq. mi.

Deputy Chief Herve Provencher
Manchester Fire Dept.
100 Merrimack St.
Manchester, NH 03103
603-669-2256
Pop.: 95,000
34 sq. mi.

Assistant Chief H. L. Sandlin
Wilmington Fire Dept.
P.O. Box 1810
Wilmington, NC 28401
919-762-4460
Pop.: 50,000
21 sq. mi.

Chief Paul Andrews
Ponca City Fire Dept.
P.O. Box 1450
Ponca City, OK 74601
405-765-4131
Pop.: 56,000
1,100 sq. mi.

Assistant Chief Steve Hacku
Fire Dept.
75 Masonic Ave.
Wallingford, CT 06492
203-269-0276
Pop.: 49,000
42 sq. mi.

Chief Ken Mikesell
City of Eau Claire Fire Dept.
216 S. Dewey St.
Eau Claire, WI 54701
715-839-5012
Pop.: 50,000
26 sq. mi.

Profile 5:

1. Dual-role, cross-trained
2. Career fire fighters serving as
3. Paramedics on
4. Transporting ambulance vehicles
5. With engine or truck company first response.

David Rockney, Paramedic Coordinator
Fairbanks Fire Dept.
EMS Division
656 - 7th Ave.
Fairbanks, AK 99701
907-452-1527
Pop.: 32,000
11 sq. mi.

Assistant Chief Harold Perryman
Springdale Fire Dept.
417 S. Holcomb
Springdale, AR 72764
501-751-4510
Pop.: 32,000
20 sq. mi.

Battalion Chief William Woodcock
Paramedic Coordinator
El Segundo Fire Dept.
314 Main St.
El Segundo, CA 90245
213-322-4311
Pop.: 15,000 (100,000 daily work force)
5.5 sq. mi.

Battalion Chief Robert R. Wall
Palo Alto Fire Dept.
250 Hamilton Ave.
Palo Alto, CA 94301
415-329-2324
Pop.: 125,000
37.5 sq. mi.

M. M. Hendrix, DFAC of Rescue
Jacksonville Fire Division
107 Market St.
Jacksonville, FL 32202
904-633-5425
Pop.: 585,000
823 sq. mi.

Chief Larry A. Kilburn
City of Miami, Fire - Rescue
2301 NW 23rd St.
Miami, FL 33142
305-579-6241
Pop.: 350,000
34 sq. mi.

Chief H. R. Stinchcomb
City of Sarasota Fire Dept.
1445 - 4th St.
Sarasota, FL 33577
813-365-1616
Pop.: 52,000 (80,000 seasonal)
17 sq. mi.

Tony Licata, Rescue Chief
Tampa Fire Dept.
808 E. Zack St.
Tampa, FL 33602
813-223-8296
Pop.: 350,000
84 sq. mi.

Deputy Chief James Quinn
Deerfield - Bannockburn Fire Dept.
839 Deerfield Rd.
Deerfield, IL 60015
312-945-4066
Pop.: 25,000
8.33 sq. mi.

Lieutenant B. Goss
Ambulance Services Officer
Elk Grove Village Fire Dept.
101 Biersterfield
Elk Grove Village, IL 60007
312-439-3900
Pop.: 25,000
14 sq. mi.

Captain Peter Andersen
Highland Park Fire Dept.
1677 Old Deerfield Rd.
Highland Park, IL 60035
312-433-3111
Pop.: 35,000
12.5 sq. mi.

Lieutenant Rick Payne
Palatine Fire Dept.
39 E. Colfax
Palatine, IL 60067
312-359-0098
Pop.: 50,000
36 sq. mi.

Chief R. N. Dunphy
Dubuque Fire Dept.
Fire Dept. Headquarters
9th and Central Aves.
Dubuque, IA 52001
319-556-1155
Pop.: 65,000
23.9 sq. mi.

Chief Earl England
Grandview Fire Dept.
1200 Main St.
Grandview, MO 64030
816-763-3900 ext. 60
Pop.: 25,000+
15.5 sq. mi.

Assistant Chief R. J. Warsocki
Omaha Fire Division
1516 Jackson St.
Omaha, NE 68102
402-444-5746
Pop.: 365,000
82.5 sq. mi.

Captain Rodger C. Crauder
Paramedic Commander
Cincinnati Fire Division
430 Central Ave.
Cincinnati, OH 45202
513-241-6700 ext. 54
Pop.: 450,000
70+ sq. mi.

Battalion Chief H. J. Dutko
Columbus Division of Fire
200 Greenlawn Ave.
Columbus, OH 43223
614-222-7384
Pop.: 670,000
179 sq. mi.

Lieutenant Laird Blanchard
Washington County Fire District #1
17880 SW Blamton St.
Aloha, OR 97007
503-649-8577
Pop.: 150,000
80 sq. mi.

Captain James R. Oldham, Sr.
Springfield Fire Division
350 N. Fountain Ave.
Springfield, OH 45504
513-324-7618
Pop.: 75,000
25 sq. mi.

Chief Ronald S. Jones
Cranston Fire Dept. Headquarters
301 Pontiac Ave.
Cranston, RI 02910
401-461-4161
Pop.: 72,000
28.2 sq. mi.

Peter Jones, EMS Coordinator
North Kingstown Fire Dept.
8150 Post Rd.
North Kingstown, RI 02852
401-294-3344
Pop.: 29,000
53.7 sq. mi.

Battalion Chief Robert N. Drummond
Providence Fire Dept.
Emergency Medical Division
209 Fountain St.
Providence, RI 02903
401-351-0505
Pop.: 160,000
18 sq. mi.

Deputy Chief Bobby C. Moore
Dallas Fire Dept.
Emergency Medical Services Division
2014 Main St., Room 211
Dallas, TX 75201
214-670-4311
Pop.: 914,000
378 sq. mi.

Chief Kenneth D. Hancock
Weber County Fire Dept.
1871 N. 1350 W
Harrisville, UT 84404
801-399-8523

Captain James Trollinger
Arlington County Fire Dept.
Emergency Medical Rescue Services Bureau
1020 N. Hudson St.
Arlington, VA 22201
703-558-2485
Pop.: 180,000
25. sq. mi.

Battalion Chief W. Weber
Janesville Fire Dept.
303 Milton Ave.
Janesville, WI 53545
608-752-2601
Pop.: 51,500+
70.1 sq. mi.

Charles Dirienzo, Chief of Paramedics
Madison Fire Dept.
325 W. Johnson St.
Madison, WI 53703
608-266-4420
Pop.: 173,000
54.9 sq. mi.

Frank Oulman
Beavertown Fire Dept.
4950 SW Hall Blvd.
Beavertown, OR 97005
503-643-7414
Pop.: 31,000
9 sq. mi.

Deputy Chief Kenneth H. Klontz
Akron Fire Dept., EMS
57 S. Broadway
Akron, OH 44308
216-275-2071
Pop.: 250,000
58 sq. mi.

Phyllis A. Riddle, RN
Emergency Medical Supervisor
Dayton Fire Dept.
300 N. Main St.
Dayton, OH 45402
513-225-5344
Pop.: 198,000
49 sq. mi.

Profile 6:

1. Dual-role, cross-trained
2. Career fire fighters serving as
3. EMTs on
4. Nontransporting vehicles
5. Without engine or truck company first response.

Battalion Chief Everett A. Hixenbaugh
Freemont Fire Dept.
4200 Mowry Ave.
Freemont, CA 94538
415-791-4292
Pop.: 135,000
96 sq. mi.

Adam Piskura, Drillmaster
Danbury Fire Dept.
19 New St.
Danbury, CT 06810
203-748-2633
Pop.: 65,000
42 sq. mi.

Captain Robert L. Zickler
Emergency Medical Services
Indianapolis Fire Dept.
555 N. Jersey St.
Indianapolis, IN 46204
317-633-6041
Pop.: 750,000
92.2 sq. mi.

Captain J. L. Cloud
Wichita Fire Dept.
455 N. Main
Wichita, KS 67202
316-268-4579
Pop.: 280,000
91 sq. mi.

Chief Ricky Davidson
Shreveport Fire Dept.
801 Crockett St.
Shreveport, LA 71101
318-226-6214
Pop.: 217,651
98 sq. mi.

George L. Herrington, Training Officer
Hattiesburg Fire Dept.
810 N. Main St.
Hattiesburg, MS 39401
601-544-5371
Pop.: 42,000
17.5 sq. mi.

Chief Robert L. Harrell
Clinton Fire Dept.
Washington and Grandriver
Clinton, MO 64735
816-885-8171
Pop.: 9,200
14 sq. mi.

Assistant Chief Harry L. Hull
Dept. of Public Safety
Room 402, City Hall
St. Louis, MO 63103
314-622-3223
Pop.: 500,000
61.37 sq. mi.

Assistant Chief Mike Holton
Carson City Fire Dept.
111 N. Curry St.
Carson City, NV 89701
702-882-1663
Pop.: 35,000
144 sq. mi.

Chief Ron Miller
Stillwater Fire Dept.
1506 S. Main St.
Stillwater, OK 74074
405-372-0497
Pop.: 40,000
500 sq. mi. (21 in city)

Marvin L. Manning, Training Officer
Eugene Fire Dept.
777 Pearl St.
Eugene, OR 97401
503-687-5411
Pop.: 130,000
85 sq. mi.

Deputy Chief James Breon
Erie Fire Dept.
311 Marsh St.
Erie, PA 16508
814-456-8561 ext. 250 or 252
Pop.: 126,000
22 sq. mi.

Brent Gibson
Ogden City Fire Dept.
320 - 26th St.
Ogden, UT 84401
801-399-8317
Pop.: 65,000
25 sq. mi.

Chief Otto Jensen
Vancouver Fire Dept.
900 W. Evergreen
Vancouver, WA 98660
206-696-8166
Pop.: 48,600
13.5 sq. mi.

Chief Robert Cole
Mt. Pleasant Fire Dept.
6200 Durrand Ave.
Racine, WI 53406
414-554-8812
Pop.: 20,000
36 sq. mi.

Chief Edward C. Carroll
City of Yakima Fire Dept.
401 N. Front St.
Yakima, WA 98901
509-575-6060
Pop.: 52,250
14 sq. mi.

Profile 7:

1. Dual-role, cross-trained
2. Career fire fighters serving as
3. Paramedics on
4. Nontransporting vehicles
5. Without engine or truck company first response.

Battalion Chief Arnold R. Weuve
Tucson Fire Dept.
P.O. Box 27210
Tucson, AZ 85726
602-791-4806 (occasional transport)
Pop.: 330,000
99 sq. mi.

Assistant Chief Harold Owens
New Haven Fire Dept.
952 Grand Ave.
New Haven, CT 06510
203-787-6219 (capable of transport)
Pop.: 127,500
18.7 sq. mi.

Assistant Chief Larry Ladd
Indian Rocks Special Fire Control District
304 First St.
Indian Rocks Beach, FL 33535
813-595-1117
Pop.: 15,000 (55,000 seasonal)
15 sq. mi.

Deputy Chief Paul J. Goodart
Largo Fire Dept.
205 Cleveland Ave., SW
Largo, FL 33540
813-581-6400
Pop.: 65,000
23 sq. mi.

Deputy Chief F. D. Heard
Atlanta Fire Bureau
46 Courtland St., SE
Atlanta, GA 30303

404-658-6901
Pop.: 450,000
132 sq. mi.

Captain Rex Shelburne
Las Vegas Fire Dept.
400 E. Stewart Ave.
Las Vegas, NV 89101
702-386-6376 (capable of transport)
Pop.: 180,527
55.5 sq. mi.

Lieutenant Sam Trujillo
Albuquerque Fire Dept.
P.O. Box 258
Albuquerque, NM 87103
505-766-7884
Pop.: 350,000
95 sq. mi.

Battalion Chief W. C. Smith
Hampton Fire Division
Fire Administration Office
22 E. Lincoln St.
Hampton, VA 23669
804-727-6296
Pop.: 125,000
55 sq. mi.

Profile 8:

1. Dual-role, cross-trained
2. Career fire fighters serving as
3. EMTs on
4. Transporting ambulance vehicles
5. Without engine or truck company first response.

Chief Joseph Granson
Kokomo Fire Dept.
215 W. Superior St.
Kokomo, IN 46901
317-457-2636
Pop.: 52,000
27 sq. mi.

Lieutenant Paul G. Lalonde
Amherst Fire Dept.
68 N. Pleasant St.
Amherst, MA 01002
413-253-3431
Pop.: 31,000 (55,000 seasonal)
27.7 sq. mi.

Chief John D. Bergeron
Lexington Fire Dept.
45 Bedford St.
Lexington, MA 02173
617-862-0272
Pop.: 33,000
16 sq. mi.

Captain Jim Clark
Methuen Fire Dept.
24 Lowell St.
Methuen, MA 01844
617-685-3535
Pop.: 40,000
26 sq. mi.

Melvin Mashburn
Broken Arrow Fire Dept.
120 West Kenosha
Broken Arrow, OK 74012
918-251-5311 ext. 231
Pop.: 50,000
225 sq. mi.

Chief Paul Gagne
Newport Fire Dept.
21 West Marlborough St.
Newport, RI 02840
401-846-2213
Pop.: 38,000
7 sq. mi.

Profile 9:

1. Dual-role, cross-trained
2. Career fire fighters serving as
3. Paramedics on
4. Transporting ambulance vehicles
5. Without engine or truck company first response.

W. G. Marable
Tuscaloosa Fire Dept.
2525 - 6th St.
Tuscaloosa, AL 35401
205-758-4749
Pop.: 216,000
1340 sq. mi.

Les Saumweber
Bolingbrook Fire Dept.
375 West Briarcliff
Bolingbrook, IL 60439
312-739-0441
Pop.: 40,000
12 sq. mi.

Chief Daniel P. Bojalad
EMS Division
Detroit Fire Dept.
900 Merrill Plaisance
Detroit, MI 48203
313-224-4623
Pop.: 1.3 million
139 sq. mi.

Chief Tom Wilson
Memphis Fire Services Division
Emergency Unit Bureau
65 S. Front St.
Memphis, TN 38103
901-527-3657
Pop.: 700,000
290 sq. mi.

Profile 10:

1. Dual-role, cross-trained
2. Career and volunteer fire fighters serving as
3. EMTs on
4. Transporting ambulance vehicles
5. With engine or truck company first response.

Chief J. T. Lehnherr
King County Fire District #2
15100 - 8th SW
Seattle, WA 98166
206-242-2040
Pop.: 31,000
5.5 sq. mi.

Deputy Chief J. Lynn Harkins
EMS Director
Valdez Fire Dept.
P.O. Box 307
Valdez, AK 99686
907-835-4313
Pop.: 4,000
275 sq. mi.

Profile 11:

1. Dual-role, cross-trained
2. Career and volunteer fire fighters serving as
3. Paramedics on
4. Transporting ambulance vehicles
5. With engine or truck company first response.

Sergeant Tom Purdue
Kensington Volunteer Fire Dept.
1411 Georgia Ave.
Silver Spring, MD 20906
301-460-5006
Pop.: 120,000
35 sq. mi.

Captain Mary Beth Michos, RN
Dept. of Fire-Rescue Services
Emergency Medical Services
10025 Darnestown Rd., #101
Rockville, MD 20580
301-279-1835
Pop.: 600,000
510 sq. mi.

Bureau Chief John T. Fuston
Prince George's County Fire Dept.
Room 2132
County Administration Building
Upper Marlboro, MD 20870
301-699-2902
Pop.: 670,000
485 sq. mi.

In 1877, mutual aid was first practiced by the cities of Boston and Chelsea, Massachusetts when they decided to share one alarm system.

Profile 12:

1. Dual-role, cross-trained
2. Career and volunteer fire fighters serving as
3. Paramedics on
4. Transporting ambulance vehicles
5. Without engine or truck company first response.

Battalion Chief Wesley Granruth
Baltimore County Fire Dept.
800 N. York Rd.
Towson, MD 21204
301-825-7310
Pop.: 700,000
615 sq. mi.

Roy E. Jones III
Brewster Fire Dept.
1657 Main St.
Brewster, MA 02631
617-896-7018
Pop.: 5,000 (20,000 seasonal)
24 sq. mi.

Captain Richard L. Steinberg
Fairfax County Fire-Rescue Services
4031 University Dr.
Fairfax, VA 22030
703-691-2951 (or 2126)
Pop.: 600,000
399 sq. mi.

Profile 13:

1. Dual-role, cross-trained
2. Career and volunteer fire fighters serving as
3. EMTs on
4. Nontransporting vehicles
5. Without engine or truck company first response.

Chief Bill J. Ford
Shawnee Fire Dept.
6501 Quivira Rd.
Shawnee, KS 66214
913-631-1080
Pop.: 30,000
37 sq. mi.

Profile 14:

1. Dual-role, cross-trained
2. Career and volunteer fire fighters serving as
3. Paramedics on
4. Nontransporting vehicles
5. Without engine or truck company first response.

Lieutenant Edwin B. White
Conyers Fire Dept.
P.O. Box 518
Conyers, GA 30207
404-483-6717
Pop.: 7,618
5.27 sq. mi.

On December 24, 1851, a fire occurred in Washington, DC in the Library of Congress, specifically the library of former President Jefferson, which then was housed in the central wing of the Capitol building. Fire fighters were unable to save anything except several portraits of presidents and the original Declaration of Independence. The entire Library of Congress contained some 60,000 volumes, most of which were destroyed.

(*History of the Washington, DC Fire Department*)

Profile 15:

1. Dual-role, cross-trained
2. Career fire fighters serving as
3. Paramedics on
4. Transporting ambulance vehicles
5. Using MEDIC COMPANY approach wherein combination fire-EMS companies provide opportunity for promoted EMS personnel to continue serving in EMS role while functioning as engineers, drivers, or company officers.

Richard E. Stallo
Gadsden Fire Dept.
90 Broad St., Room 216
Gadsden, AL 35901
205-547-8494
Pop.: 53,000
55 sq. mi.

Phoenix, AZ (see Profile 2)

Deputy Chief Tom Boylston
Deerfield Beach Fire-Rescue
928 East Hillsboro Blvd.
Deerfield Beach, FL 33441
305-427-3331 ext. 302
Pop.: 44,000
10 sq. mi.

Assistant Chief Robert Pye
St. Paul Dept. of Fire and Safety Services
101 E. Tenth St.
St. Paul, MN 55101
612-224-7811
Pop.: 280,000
55 sq. mi.

John Whitney
Salem Fire Dept.
370 Trade St., SE
Salem, OR 97301
503-588-6245
Pop.: 150,000
360 sq. mi.

Chief Paul J. Athens
Beloit Fire Dept.
524 Pleasant St.
Beloit, WI 53511
601-364-6865
Pop.: 85,000
65 sq. mi.

Profile 16:

1. Dual-role, cross-trained
2. Career fire fighters serving as
3. Paramedics on
4. Nontransporting vehicles
5. Using MEDIC COMPANY approach wherein combination fire-EMS companies provide opportunity for promoted EMS personnel to continue serving in EMS role while functioning as engineers, drivers, or company officers.

Battalion Chief Pete Cernich, Paramedic Coordinator
Littleton Fire Dept.
2255 W. Berry Ave.
Littleton, CO 80165
303-795-3800
Pop.: 107,000
43 sq. mi.

WE WANT TO KNOW . . .

- if a name, an address, or a phone number has changed; if there's an upcoming event, a new program or course, a new publication being offered. If you have more current information than is contained in this *Almanac*, know something that should be included in this book, or just have something interesting about the fire protection scene that you want to contribute, please let us know. Write: Editor, *Fire Almanac*, NFPA, Batterymarch Park, Quincy, MA 02269. All suggestions will receive our careful attention.

Profile 17:

1. Dual-role, cross-trained
2. Career fire fighters serving as
3. EMTs on
4. Nontransporting vehicles
5. Using MEDIC COMPANY approach wherein combination fire-EMS companies provide opportunity for promoted EMS personnel to continue serving in EMS role while functioning as engineers, drivers, or company officers.

Deputy Chief William Cantwell
Cambridge Fire Dept.
491 Broadway
Cambridge, MA 02138
617-876-0125
Pop.: 100,000
6 sq. mi.

Chief Thurman Bishop
Fayetteville Fire Dept.
155 Bow St.
Fayetteville, NC 28301
919-484-8131 (occasional transport)
Pop.: 63,500
33.2 sq. mi.

Profile 18:

1. Dual-role, cross-trained
2. Career fire fighters serving as
3. Paramedics on
4. Transporting ambulance vehicles with
5. Police paramedics as first responders in vehicles capable of transporting.

Frank Novac, Fire Paramedic Coordinator
Lansing Paramedics
3404 Lake St.
Lansing, IL 60438
312-474-2131
Pop.: 33,000
7.5 sq. mi.

Profile 19:

1. Dual-role, cross-trained
2. Career fire fighters serving as
3. Paramedics on
4. Transporting ambulance vehicles
5. With POLICE first response.

Lieutenant Otis N. Tyler
Philadelphia Fire Dept.
SEC 3rd and Spring Garden Sts.
Fire Administration Building
Philadelphia, PA 19123
215-686-4718
1.9 million
129 sq. mi.

Profile 20:

1. Dual-role, cross-trained
2. Career fire fighters serving as
3. EMTs in first response on
4. Transporting ambulance vehicles and
4. Paramedics in
6. Vehicles capable of transport.

Note: This profile represents a multi-level EMS response by fire departments. Some services listed in other profiles may also use such a multi-level approach, or variations of this approach.

Captain Jerald A. Birt
Seattle Fire Dept.
301 2nd Ave., S
Seattle, WA 98104
206-223-3057
Pop.: 500,000
94.5 sq. mi.

Deputy Chief Fred Baker
Shoreline Fire Dept.
1016 N. 175th
Seattle, WA 98133
206-546-2234
Pop.: 73,000
22 sq. mi.

William Stamm, Chief Engineer
Milwaukee Fire Dept.
711 W. Wells St.
Milwaukee, WI 53233
414-276-5656
Pop.: 637,231 (occasional transport)
95.8 sq. mi.

Profile 21:

1. Civilian
2. Career members of the fire department serving as
3. Paramedics on
4. Transporting ambulance vehicles
5. With engine or truck company first response.

B.F.C. Ramon F. Granados
District of Columbia Fire Dept.
614 H St., NW
Washington, DC 20001
201-745-2348
Pop.: 650,000
69 sq. mi.

Gerald L. Fair, EMS Director
Alexandria Fire Dept.
Emergency Medical Services
900 Second St.
Alexandria, VA 22309
703-750-6526
Pop.: 118,000
15 sq. mi.

Profile 22:

1. Civilian
2. Career members of the fire department serving as
3. Paramedics on
4. Transporting ambulance vehicles
5. Without engine or truck company first response.

Ray Williams
Metropolitan Fire Dept.
Emergency Ambulance and Rescue Division
73 Hermitage Ave.
Nashville, TN 37210
615-259-5820
Pop.: 490,000
533 sq. mi.

Terry A. Hatton MICP, Administrator-Coordinator
Huntington Emergency Ambulance Rescue Team
Huntington Fire Dept.
839 Seventh Ave.
Huntington, WV 25701
304-696-5960
Pop.: 90,000
16 sq. mi.

Profile 23:

1. Volunteer fire department with
2. EMTs on
3. Transporting ambulance vehicles
4. Without engine or truck company first response.

Assistant Chief John H. Zylma
Gravel Ridge Fire Dept.
P.O. Box 166
Gravel Ridge, AR 72076
501-835-4518
Pop.: 5,000
6 sq. mi.

Chief Jerry Renchin
Falcon Heights Fire and Rescue
1644 West Lappenteur Ave.
Falcon Heights, MN 55113
612-644-5050
Pop.: 6,000
2.5 sq. mi.

Profile 24:

1. Volunteer fire department with
2. Paramedics on
3. Transporting ambulance vehicles
4. Without engine or truck company first response.

R. S. Rockenbach, EMS Manager
Grayslake Fire Dept.
P.O. Box 81
Grayslake, IL 60030
312-223-8960
Pop.: 13,000
22.5 sq. mi.

Chief Lanee Russell
Peotone Fire Dept.
Peotone, IL 60468
312-258-6824
Pop.: 6,000
80 sq. mi.

Profile 25:

1. Volunteer fire department with
2. EMTs on
3. Nontransporting vehicles
4. Without engine or truck company first response.

Dick Ash, EMS Manager
Pleasant Hill Fire Dept.
36024 Highway 58
Pleasant Hill, OR 97401
503-747-8016
Pop.: 5,052
22.5 sq. mi.

James W. Graue, EMS Manager
Spokane County Fire District #8
Valleyford, WA 99036
509-922-3869

Lieutenant Richard Martin
Seaside Volunteer Fire Dept.
851 Broadway
Seaside, OR 97138
503-738-5511
Pop.: 5,750
12 sq. mi.

Profile 26:

1. Volunteer fire department with
2. Paramedics on
3. Nontransporting vehicles
4. Without engine or truck company first response.

Jerry Celeste, EMS Manager
Southern Platte Fire Protection District
Box 12046
Parkville, MO 64152
816-741-2900
Pop.: 3,000
50 sq. mi.

While the next two profiles are not strictly fire-EMS programs, they are included for your reference.

Profile 27:
Public Safety Officer (PSO) (combination police, fire, EMS).

Charles Tice
Oak Park Public Safety
13600 Oak Park Blvd.
Oak Park, MI 48237
313-547-1337
Pop.: 32,000
5.5. sq. mi.

Profile 28:
Third Service.

Leslie Hichambottom, Administrative Technician
Public Safety Agency, City of Pasadena
175 N. Marengo Ave.
Pasadena, CA 91101
213-577-4680
Pop.: 115,000
23 sq. mi.

Sue Edwards, Acting Director
City of Austin
EMS Dept.
P.O. Box 1088
Austin, TX 78767
512-473-6461 ext. 5136
Pop.: 400,000
1,000 sq. mi.

Chief Adrian C. Morrman
Dept. of Public Health
Paramedic Division
135 Polk St.
San Francisco, CA 94102
415-553-1574
Pop.: 650,000
49 sq. mi.

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Source: The National Registry of Emergency Medical Technicians

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Source: Fire Service EMS Program Management Guide, ACT Foundation, FEMA, 1980.

Reference

Significant Legal Cases Affecting the Fire Service

In recent years, the fire service has been greatly affected by activities in the courtroom. This section will list and discuss a number of the more significant decisions which will have and are already having, an effect on the fire service. No attempt is made to be exhaustive in any specific area or to touch on every area of interest. However, this section should indicate the major trends of the law in a specific area and could serve as a basis for further research. If an actual problem with legal implications exists, a municipal attorney, if available, or a private attorney should be consulted.

Retrospective Enforcement of Codes and Ordinances

When a local code or ordinance is passed requiring owners of certain property to upgrade their facilities, there are those who feel the financial burden is more than they should be asked to bear. Perhaps the leading article on this issue is one by Prof. Vincent M. Brannigan which appeared in the November 1981 issue of *Fire Journal*. A reading of this article is recommended for a more in-depth treatment.

There are a number of cases in this area of which *Queenside Hills* v *Saxl*, 328 U.S. 80, 55 S.Ct. 850 (1946) may be the most important. This case, which was decided by the U.S.

Supreme Court, evolved when a New York lodging house that was built to 1940 codes, was required to make alterations to meet a 1944 ordinance. The owner sued, claiming that his rights to due process of law and equal protection of the laws was violated. Justice Douglas wrote a rather brief and direct opinion in which he dealt with these two arguments and upheld the constitutionality of the ordinance. As to due process, he felt the legislature should decide what regulations they would require to minimize fire hazards. He pointed out that the new ordinance was drawn under the police power, the general power to protect public health and safety. Douglas called the police power one of the least limitable of governmental powers which often cuts down property rights.

Although the decision contained a sweeping statement, which might have wide application, it said, "But in no case does the owner of property acquire immunity against exercise of the police power because he constructed it in full compliance with the existing law." Dealing with the equal protection argument, the Court said that in the absence of an actual class of houses that escape the law, this argument will fail.

The *Saxl* case identified the principle which underlies the area of retrospective code enforcement, the rejection of the equal protection argument, and the deferral to legislative wisdom operating under broad sweep of the police power. The courts will, however, void a code or ordinance where they find it has no relation to the legislative objective. This was the case in *Leathers* v *City of Burns*, 444 P. 2nd 1010 (1968), an Oregon case brought to challenge two ordinances of the City of Burns. One ordinance limited the size of gasoline tank trucks, the other limited the quantity of underground gasoline storage. The Court saw its function not as determining the wisdom of the legislation, but rather they felt they could strike down the ordinance only if it could be shown that it had no rational relation to its objective. On this basis, the Court upheld the ordinance regarding tank truck size, while seeming to disagree with the logic behind it. They struck down the underground storage ordinance because they found size posed no greater danger of fire. Thus, the Court perceived no connection between public safety and the storage ordinance.

While in these cases the courts have specifically disavowed any consideration of the economic consequences, leaving that to the legislature, some cases have looked to economics and balanced cost against public safety. A clear case of this attitude was found in *City of Chicago* v *Sheridan*, 40 Ill. App. 3rd 886, 353 N.E. 2nd 270 (1976), involving a firesafety ordinance which applied to a two-family house. The Illinois Appellate Court specifically found that the city had the requisite power to make codes that will have retrospective application to existing buildings. The Court, however, went on to employ a balancing test weighing cost against public safety. They deferred to a finding of a lower court which had balanced the interests in this manner and decided in favor of the property owner.

This sort of balancing of interests could be troublesome to rigorous code enforcement. But it does not seem to be widely followed and probably applied only to the case just cited. In the case of *City of St. Louis* v *Brune*, 515 S.W. 2nd 471 (1948), which also employed a balancing test, the Court noted the conflicting testimony on the issue of whether the health ordinance under review had any relation to its objective. There was a vigorous dissent which cited the principles of deference to legislative wisdom operating under the police power.

The balance of interests reasoning does not seem to be the prevalent direction of the law. The basic law in the area seems best exemplified by the principles of the *Saxl* decision. The courts will usually defer to a legislative body which is acting under the police power and the specific power to write such codes has really not been challenged. Courts will strike down ordinances and codes that have no relation to their purported objectives. The argument of financial burden has been used with some success but, generally, the courts have not employed a balancing test, leaving that to the legislative body that wrote the subject code or ordinance.

Ordinance Authority

The subject of municipal organization and authority is too broad for examination here. Rather, this section will focus on three recent areas which have dealt with the enforceability of local ordinances. These ordinances sought to restrict the actions of, or set a code of conduct for, members of the fire service. Each is a detailed decision, only capsuled here, and should be read in full if there is a relevant problem.

The case of *Davis* v *Williams*, 617 F. 2nd 1100 (1980), arose out of a dispute involving the need for additional staffing for an ambulance service that the city was taking over. The head of the local fire fighter's union made derogatory public statements about the chief and his leadership. The chief had him suspended, basing the suspension on city ordinances prohibiting a wide variety of speech concerning departmental affairs outside of in-house channels. The chief also relied on an ordinance which generally prohibited conduct prejudicial to good order. The fire fighter brought suit, and the Federal District Court declared the ordinances unconstitutional and ordered the fire fighter reinstated. The city appealed this ruling, though they apparently did reinstate the fire fighter with back pay.

The city's appeal centered on the invalidation of the ordinance which allowed discipline for "conduct prejudicial to good order." The city sought to show that the fire department was a military-type organization and, thus, military decisions upholding such general rules of conduct should apply. The Circuit Court of Appeals rejected this reasoning, pointing out that a fire department was, at best, quasi-military, and then chiefly when on actual duty. But the Court did uphold the rule. They felt that writing a rule in such broad language was the only way that an employee could be given notice that an employer "thinks himself entitled to impose punishment on grounds that are not set out with particularity."

An important aspect of the Court's decision was their analysis of the character of the employment involved and the strength of the governmental interest involved in regulating the conduct of the employee. They looked at such factors as the size, need for discipline, and function of a fire department. Based on the factors they found and the mentioned notice argument, they refused to rule the ordinance facially invalid.

The case of *Hays* v *City of Wilmington*, 451 F. Supp. 696 (1978), gave the Federal District Court in Delaware an opportunity to review an ordinance similar to the one involved in *Davis* v *Williams*. This case evolved when an off-duty fire fighter was arrested for operating under the influence of alcohol. As a result of his court appearance, the fire fighter reported five hours late for duty and initially filed an insufficient report on his whereabouts. He was suspended and not given a hearing within the department for four and one-half months. At the hearing he was given 1,000 unpaid discipline hours to work along with five years of departmental probation. The particular provision under which he was disciplined required fire fighters to, at all times, conduct themselves in a manner which will not bring discredit to the department.

The fire fighter brought suit to have his suspension and subsequent discipline invalidated. Both the fire fighter and the city brought Motions for Summary Judgment. The Court upheld the constitutionality of the ordinance in question, based primarily on the fact that it was intended to regulate conduct, not speech. Had it been worded to involve speech, it might well have been struck down. The fire fighter brought other claims which the Court found in favor of the city. Neither the original summary procedures used for his first suspension of 10 days nor the procedure of allowing overtime unpaid hours for discipline were contrary to public policy, nor did they violate state laws against unpaid overtime, which was considered an acceptable alternative to outright unpaid suspension.

While the *Davis* and *Hays* cases have examined similar general, sweeping ordinances and upheld them, another case has taken a different view. The case of *McCallum* v *Hinson*, 489 F. Supp. 627 (1980), grew out of the suspension of a fire fighter for secretly taping a conversation between himself and his chief. The fire fighter had been active in trying to re-establish a union which had been broken after an unsuccessful strike. The chief pointed to the secret taping incident and invoked ordinances prohibiting disrespect to superior officers, conduct unbecoming a fire fighter and a gentleman, and conduct subversive of good order and the discipline of the department.

The suspended fire fighter brought suit seeking to invalidate the specific ordinance and the entire Code of Conduct which the city had written to control a whole range of actions by city fire fighters and police officers. The Federal District Court took a very sweeping view of the case. The Court found that the secret taping had violated no state or federal ordinance, and treated it as no more than repeating a conversation. The Court went on to set out in explicit detail the thought process which it felt the chief had gone through in actually suspending the fire fighter for his union activities and not for the secret taping. The Court then discussed the chilling effect that ordinances of a non-specific nature, such as those described, would have since people governed by them would be uncertain that their legitimate actions might be proscribed. Based on this "chilling effect view," the Court ruled unconstitutional each of the ordinances on which the suspension had been based as well as the city's entire Code of Conduct.

While the *Hinson* case may be an example of judicial activism, it does show that there is a fine line between those ordinances that will be upheld and those that will be struck down. This fine line may be based on the wording or application of the ordinances, but it may also be based on the views of a particular judge. Those seeking to enforce such ordinances should be well aware of the problems involved and certain that the problems have been carefully reviewed by a municipal attorney. Even with these precautions, a test of sweeping conduct ordinances can be expected.

Employer-Employee Law for the Fire Service

It would be impossible here to cover all aspects of the employment relationship as it applies to members of the fire service. In the previous section, some problems were discussed that have arisen concerning municipal ordinances and their right to control the activities of employee fire fighters. In this section, significant cases from two areas of employer-employee law will be discussed: 1. basic rights to unionize and collectively bargain, and 2. pension rights.

The case of *Beauboeuf, et al* v *Delgado College*, 428 F. 2nd 470 (1970), involved an organization of teachers employed at a state junior college. The teachers brought suit seeking to force the college to bargain collectively with them. Their suit was dismissed by the Federal District Court, and the dismissal was affirmed by the Court of Appeals on the ground that there was no law which required the college to bargain. The Court specifically said that the college's failure to agree to bargaining presented "no cognizable issue of due process or equal protection." The *Beauboeuf* case stands for the proposition that, in the absence of statute, there is no constitutional right to require the state to bargain collectively with a public employee union.

This does not mean that public employees cannot form themselves into unions. In the case of *Atkins* v *Charlotte*, 196, F Supp. 1068 (1969), a Federal District Court examined two anti-union statutes of the state of North Carolina. One statute specifically prohibited public employee labor unions, and the other statute made any agreements between a municipality and a labor union illegal. Both of these decisions were challenged by members of the Charlotte Fire Department joined by the International Association of Fire Fighters (IAFF). The Court struck down the statute prohibiting union membership as they felt it violated constitutional rights of free speech and free assembly. At the same time, the Court refused to void the statute making agreements illegal. They found nothing in the U.S. Constitution that entitles one to have a contract with another who does not want it.

Statutes in most states have now given the right to require collective bargaining and to form unions, the rights sought to be denied by the statutes examined in these two cases.

Actually, strikes by members of the fire service are still widely banned. The courts have upheld the right of the states to make such a prohibition, citing the public interest involved in the continual availability of fire fighting forces. The case of *Burnley* v *Thompson*, 524 F. 2nd 1233 (1975), is an example of this concept. This case evolved when a strike by fire fighters in Macon, GA occurred over disparate pay for fire fighters and police officers. After some attempts to settle the matter, the city dismissed a number of fire fighters. Eventually, a settlement was reached under which the city agreed to rehire approximately one-third of the fire fighters to be determined by the city council. The fire fighters who were not rehired brought a civil rights suit challenging their suspensions and the rehiring procedures. The Court dealt promptly with those strikers who had been on probationary status. It was ruled that, because of their status, they had no property interest cognizable under the 14th Amendment; therefore, they had no right to complain about their summary suspensions. Turning to the regular fire fighters, the Court upheld their suspensions without hearing based on the significant public interest of the city in the prompt determination of the status of fire protection forces. Furthermore, the Court ruled that the fire fighters had no basis to object to the determinations of the city council with regard to rehiring since they had agreed to the procedure. Although, the legal action, like the strike itself, turned into a significant setback for the fire fighters, it gave the Court a good opportunity to clarify its views on an unauthorized strike.

Pension rights, while largely matters of state statute varying in each jurisdiction, have received judicial attention, the basic points of which can have more general application. In order to highlight a number of these points, full case discussion will be limited to case holdings with essential facts.

A good starting point would be the fire fighter's rights to pension benefits. In the absence of statute, there probably are no such rights, but states have universally developed some form of pension and disability laws for members of the fire service. It has been held that such pensions are not just matters for local consideration and, in fact, are something of state-wide concern. One case in Colorado - *Huff, et al* v *Mayor and City Council of the City of Colorado Springs*, 512 P. 2nd 632 (1973) - ruled that under the Colorado Constitution, which gave the state no jurisdiction over strictly local matters, the municipality could not lower their statutory payments into a fire fighter's pension fund based on the argument that it was wholly a local matter. When allowed by statute, pensions are vested rights of the intended recipients. Thus, in the city of Idaho Falls, which by state constitution could appropriate money only on a pay-as-you-go basis except for "ordinary and necessary expenses," the pension allotments for city police officers were determined to be such "ordinary and necessary expenses." The case of *Hanson* v *City of Idaho Falls*, 446 P. 2nd 634 (1968), went on to indicate that since pensions are vested they must be deemed compensatory in nature and viewed not as gratuities but as founded on faithful, valuable services actually rendered over many years.

A case in which the vesting rationale of *Hanson* was employed was that of *Gardner* v *Nation*, 522 P. 2nd 1281 (1974). This case was brought as a result of the involuntary retirement without hearing of a fire fighter who had reached the age of 65. The fire fighter's case was based on the fact that, when be began employment, there was no such retirement age. Unfortunately for him, due to the interaction of changed requirements and his own age, he did not have sufficient years for a full pension. The Court upheld the right of the city to set a retirement age and to then retire a fire fighter without a hearing. The Court cited the *Hanson* case which held that pension plans are vested subject to reasonable modification for the purpose of keeping the plan flexible and maintaining its integrity. The fire fighter's contention was rejected and the existing pension law was determined to be applicable to his employment, even though it was enacted after he had actually commenced his employment.

The case of *Lyons* v *Workmen's Compensation Appeals Board*, 44 CA 3rd 1007, 119 Cal. Rptr. 159 (1975), was decided in part on the basis that a city charter constituted a contract between the city and its employee fire fighters. In that case, a fire fighter who had received a disability sued to receive workmen's compensation also. The Court allowed the recovery but gave the city credit for any sums paid under the disability. On appeal, that decision was upheld because the Court looked at the city charter which, they felt, contained implied notice that full double recovery was barred. The Court noted the interests of the city in preventing such double recovery and, since this Charter constituted a contract, it could be read against the fire fighters. Thus, benefits were allowed under both disability and workmen's compensation, but the sums paid under disability were credited against the amount to be received under compensation.

Courts have excluded a fire fighter from the receipt of any benefits if the fire fighter was actually discharged when application was made. This issue surfaced in the case of *Freberg v Board of Trustees of Firemen's Pension Fund of the City of Highland Park*, 128 Ill. App. 2nd 369, 262 N.E. 2nd 22 (1970). In this case, a fire fighter was discharged for conduct unbecoming an officer; he did not appeal the discharge. He soon made application for a non-service connected disability on the basis that he was a permanently, emotionally disturbed fire fighter. His application was denied by the Trustees of the Board, but this denial was reversed by a Trial Court. On appeal, the Illinois Appellate Court looked at the relevant state statute, particularly a phrase which read, "so as to render necessary his retirement from service." To the Court this implied that one must still be a fire fighter at the time of application. They went on to indicate that a "fire fighter means a fire fighter on active duty, on inactive duty, on a leave of absence, suspended, or retired, but not a fire fighter who has been discharged. They held that a fire fighter discharged, ceases to be a fire fighter, and any rights from such capacity are terminated.

The holding that discharge cuts off all rights to pension runs contrary to the idea of vesting. Unfortunately, since these cases were decided based on state statutes other than Constitutional principles, it is difficult to make direct comparisons between the two trains of thought.

Many cases involve appeals from adverse findings of pension fund Board of Trustees. In these cases, the standard by which the Courts will examine the Board's findings is all important. Will the Court supplant the Board's judgment on all factors with its own or will the Court defer to the Board's findings unless clearly wrong? This was examined in the case of *Reisner v Board of Trustees of Fire Retirement System*, 203 N.W. 2nd 812 (1973). In that case, the Court ruled that it would uphold the findings of the Board if their decision was at all justified by the evidence. There had been conflicting medical testimony in the case regarding whether or not a fire fighter was incapacitated. Since there had been evidence upholding the Board's denial of a pension, the Court affirmed the finding. Three judges argued in dissent that the medical evidence concerning incapacity was given without using the proper standard concerning incapacity for the fire fighter's work. They were indirectly arguing that evidence should be re-examined, but the majority, which narrowly viewed the court's function had foreclosed this argument.

The cases cited in this article are neither all the cases nor all the issues involved in the employer-employee relationship for fire fighters. The principles raised, however, should have some general application, covering some of the common problems faced by working fire fighters and fire officers.

Rights of Entry and Action for Fire Inspectors and Fire Fighters

When, and for what reasons, can a fire inspector or fire fighter demand entrance to private property, and what items can be siezed after entry?

The Fourth Amendment to the Constitution restricts entry to property but, at the same time, inspectors need the ability to perform their work. The essence of fire fighting requires instant entry that cannot be unduly hindered. There are three Supreme Court cases which identify the perimeters of fire service authority in this area.

The first two of these cases were heard and decided together by the U.S. Supreme

Court. They are *Camara* v *Municipal Court of San Francisco*, 387 U.S. 523, 18 L. Ed. 2nd 930, 87 S. Ct. 1727 (1967) and *See* v *City of Seattle*, 387 U.S. 541, 18 L. Ed. 2nd 943, 87 S. Ct. 1737 (1967). In the *Camara* case, a housing inspector demanded entrance to a first-floor business area of a building which Mr. Camara had rented. The inspector had information that Camara was living in the rear, an occupancy that was contrary to ordinance. Entrance was demanded based on a city ordinance allowing the inspector broad powers to enter and search. When Camara continued to refuse, a complaint was sought in the Municipal Court. Camara sought to prohibit the prosecution, arguing his 4th Amendment rights and the lack of a warrant. The Superior and Supreme Courts of California decided against him, but an appeal to the U.S. Supreme Court reversed the California decision and decided in his favor.

In its finding, the Supreme Court held that regulatory inspections had to be done pursuant to a warrant unless the property owner or occupant gave consent. The same principle applies to a fire code inspection. Emergency inspections are, however, exempted from the warrant requirement. Also, the warrant required does not have to meet the same rigorous standards necessary for a criminal search warrant. Rather, the Court recognized that regulatory searches are required and carried out for different reasons than for criminal searches and took the view that reasonableness would be the key criteria for a regulatory warrant. "If a valid public interest justifies the intrusion contemplated, then there is probable cause to issue a search warrant."

The case of *See* v *City of Seattle* involved a fire department code enforcement search of a locked warehouse. The Supreme Court determined that the only essential difference between this case and the *Camara* case was that this case did not involve an actual dwelling. The Court, however, found this not important enough to require a different result and required a warrant just as they had in the *Camara* case.

These two cases have set the law with regard to the regulatory search since they were decided in 1967. A more recent case discussed the rights of fire service personnel in the criminal context. *Michigan* v *Tyler*, 436 U.S. 499, 56 L. Ed. 2nd 486, 98 S. Ct. 1942 (1978), grew out of a fire in business property leased by Mr. Tyler and his partner, Mr. Tompkins. During the final stages of the fire, some plastic containers of flammable liquid were turned over to the fire chief examining the scene, who then called in a police detective. The detective took some pictures, left, and returned later after all fire apparatus had left. Various articles were removed from the scene, and used later in a criminal trial against Tyler and Tompkins. Three weeks after the fire, a state police investigator entered the building, took pictures, and removed material which was also used against them. At the trial court, all of the material was admitted and both men were convicted of arson. The Supreme Court of Michigan later reversed the conviction and ordered a new trial, barring from evidence the material seized from the building, all of which had been taken without a warrant.

The U.S. Supreme Court took the case and agreed that there had to be a new trial. However, they examined the admissibility of evidence and did not go nearly as far as the Michigan Court in striking down admissibility. Instead, they decided that all of the material taken by the fire chief and the detective would be admissible, while material taken weeks later by the state police officer was inadmissible. Regarding the investigations by the chief and detective, the Supreme Court said that, "An entry to fight a fire requires no warrant and that, once in the building, officers may remain there for a reasonable time to investigate the blaze." On this basis, they felt that the initial activity was part of this investigation and included the later police entry because it was part of the same activity. Since an investigation of the fire scene three weeks later was beyond anything reasonable, that material would have to be stricken.

The Court indicated further that, after the initial, justifiable entry for investigation of cause, a warrant would be required and would have to be obtained under the standards established by *Camara* and *See* for regulatory searches. However, if an investigation of cause turned into a criminal investigation of arson, then a warrant under the normal criminal procedures would be required in order to demand further entry.

General search and seizure principles involving the right of an officer properly on a premises to seize evidence found have been used in a number of cases. Two notable examples of their use are *U.S.* v *Green*, 474 F. 2nd 1385 (1973), and *U.S.* v *Gorgotto*, 476 F. 2nd 1009 (1973). In each of these cases, investigations into the cause of the fire, held immediately after the fire was extinguished, turned up evidence of other crimes. In Green, counterfeit plates were found, while in *Gorgotto*, betting slips were found. In both cases, the material was introduced into evidence, and justified, based on the fact that the officer had a right to be on the premises, and he could, therefore, seize evidence of crime which came into his view. This is a well-known doctrine which was simply reconfirmed for the fire service.

It should be remembered that exclusion of improperly seized evidence applies only in cases involving the government. Therefore, no material excluded from a criminal trial will be admitted in a civil trial. The case of *Honeycutt* v *Aetna Insurance Co.*, 510 F. 2nd 340 (1975), evolved after the burning of a home for which Aetna refused to pay insurance, claiming arson by the homeowner. The homeowner sued, and, as part of its defense, Aetna used materials taken from the premises both by fire fighters and by Aetna's own investigators. No search warrant was issued allowing this seizure; nevertheless, the Circuit Court of Appeals ruled that material seized by public officers, even if wrongly taken, could be used in civil actions and that material taken by Aetna's own agents could also be admitted. Thus, the exclusionary rule, so important in criminal or state regulatory litigation, has no place in civil trials.

Camara, *See*, and *Tyler* are all cases with which every fire officer or inspector should be familiar. They set general guidelines on search and seizure, a difficult and often-litigated field, fraught with exceptions, and based on finely-drawn lines. Any questions on search and seizure should be raised with your municipal attorney as soon as possible. It would be unfortunate to have important evidence of arson, or some other crime, or evidence of regulatory violation, stricken from use due to the faulure of an eager investigator to properly understand the procedures to be followed.

Tort Law and the Fire Service

Torts is that branch of the civil law which deals with private wrongs between parties. In most cases, it involves an injured party seeking recompense against one who is claimed to have caused the injury. As it involves the fire service, there are two areas examined here: the areas of injuries to a fire fighter by the actions or non-actions of citizens, and injuries caused to citizens by the actions or non-actions of a fire fighter.

The state of the law concerning injuries to a fire fighter can be shown best by three cases from Illinois and two from other jurisdictions. *Dini* v *Naiditch*, 20 Ill. 2nd 406, 170 N.E. 2nd 881 (1960), involved serious injury to a fire fighter when a stair collapsed in a hotel fire. The Supreme Court of Illinois reviewed prior law which had held that a fire fighter was an invitee on property when fighting a fire, which meant that a landowner need only avoid willful or intentional injury. The Court struck down that doctrine and held that a fire fighter was an invitee to whom a landowner owed a duty of reasonable care to prevent injury. In this case, there was significant evidence of code violations, lease violations, and other activities which made the premises unsafe, so the Court allowed a jury verdict to stand in favor of the injured fire fighter. It is also important to note that the injury here was not caused by the fire itself. Rather, it was a result of a falling staircase which was found to have been poorly maintained. This case has received much attention, and its holding of a fire fighter as an invitee is a cornerstone for this area of the law.

A few years later, the case of *Netherton* v *Arends, et al*, 81 Ill. App. 2nd 391, 225 N.E. 2nd 143 (1967), illustrated the importance of the key points of the *Dini* case. In *Netherton*, an injured fire fighter brought suit based on allegations that acts such as storing flammable materials, certain acids, and ether on premises and placing large quantities of straw against the foundation were evidence of negligence, which had unreasonably increased the fire hazard. The case was dismissed on the pleadings. The Illinois Supreme Court unheld the dismissal, drawing an important distinction between injury caused by hidden defects on the premises about which the fire fighter should have been warned as opposed to the basic factors which caused the fire. The Court found that the fire fighter's allegations were "elusive" as to just how the negligence of the property owner had been the factor that caused the injury. Unless that relationship was clear, the Court held "the hazards that the fireman faced were only those hazards incidental to the employment that was his."

In these two cases the Court is saying that by the nature of the job, a fire fighter takes certain risks, and has no right to sue for risks assumed. The fire fighter will only have a right to sue if there were defects in the property of which the fire fighter could have been warned by the property owner.

In the 1976 case of *Washington* v *Atlantic Richfield Corp.*, 36 Ill. App. 3rd 344, 342 N.E. 2nd 271 (1976), the Illinois Supreme Court seemed to go one step further and expanded the rights of fire fighters to bring suit. This case involved serious injuries to a fire fighter at a gasoline station fire. Evidence was entered concerning state and local code violations as well as failure by the defendant to properly inspect the station and enforce these rules. A lower court granted Summary Judgment in favor of the defendant. The Appellate Court reversed this judgment and allowed amendments to the Complaint. The Court took the position that there could be liability when a property owner has failed to keep his premises in a reasonably safe condition, and the hazard of fire and loss of life fighting it were reasonably foreseeable. Thus, a fire fighter might have a cause of action against one who negligently maintains his premises in such a manner that creates the fire hazard. It is uncertain if other states have taken this position.

The case of *Bartels, et al* v *Continental Oil Co.*, 384 S.W. 2nd 667 (1964), dealt with the problem of fire fighters' injuries. This case involved a fire at a tank storage area. Bartels and four other fire fighters were killed when a storage tank "rocketed" 75' in a ball of flames. His widow sued and won a judgment against the oil company. The Missouri Appeals Court upheld the verdict citing that, while an experienced fire fighter would accept the presence of gasoline as a known hazard in this type of fire, the fire fighter is not expected to assume all possible lurking risks. The Court felt that liability could be based on hidden dangers where the owner or occupant had an opportunity to warn the fire fighters. The hidden dangers here were the tanks that had been in place for forty years and were equipped with 2-inch vents, although NFPA and API requirements called for 5-½-inch free circular vents. The fire fighters could not have known of the defect and, thus, there could be a finding against the oil company.

The principles of these cases involving the assuming by the fire fighter of the inherent danger of fire and certain risks that go along with the job while not assuming the risk for hidden defects of which the fire fighter had no warning seems to have evolved into what has come to be known as the "Firemen's Rule." There is not, however, universal agreement on what the rule is. Two recent cases have each used the phrase, each with a slightly different definition.

A recent Nebraska case, *Lave* v *Newmann*, 211 Neb. 97, 317 N.W. 2nd 779 (1982) defined the rule this way, "A fireman or individual fighting a fire on the premises of an owner is a bare licensee to whom the owner or occupant owes no greater duty than to refrain from injuring him by willful or wanton negligence or a designated injury, except in certain cases where there may be a duty to warn of hidden danger or peril known to the owner or occupant but unknown to or unobservable by the fireman in the exercise of ordinary care."

At the same time, another recent case, *Spargur* v *Park*, 180 Cal. Rptr. 257, indicates that the "Firemen's Rule" provides that negligence in causing fire furnishes no basis for liability to a professional fire fighter, but that the rule does not automatically bar recovery for injury in the line of duty if the injuries were caused by a separate, independent cause or circumstance.

Although these definitions of the rule are close, there are some definite distinctions. The basic principles are, however, the same. There is probably no one unequivocal statement of the "Firemen's Rule" for the whole country, but the general principles apply in most states.

The last general area to be considered in the discussion of torts is that of tort liability arising from the actions or non-actions of members of the fire service, including fire inspectors. The principle question in this area is when and under what circumstances can the plaintiff recover against the municipality. Unfortunately, there are few hard and fast universal rules to provide an answer, since the law is currently undecided about this issue. For almost every case where municipal liability is allowed, another case from another jurisdiction will deny liability on a similar set of facts. The principles, however, are worth discussing here, but ask your municipal attorney to determine the state of the law in your own jurisdiction.

Although there is no common law requirement that a municipality provide fire services, some form of local fire services are required by most states. When can the municipality be held liable if these services are delivered negligently? Historically, governmental immunity has barred such suits. This was the basis of the decision in *Heieck and Moran* v *City of Modesto*, 411 P. 2nd 105, 64 C. 2nd 229, 49 Cal. Rptr. 377 (1966). In this case a plaintiff claimed, among other things, that the city was liable for a failure to summon an available county water truck when they knew that a water main was out. The claim was found to be barred by governmental immunity.

Governmental immunity, a time-honored common law concept, is still the law in numerous jurisdictions, but it has been specifically discarded in many others. Among those states that have done away with traditional immunity, there is no single rule allowing suits for negligence against the fire service. Some states have allowed complete amenability to suit; some have looked at the potential problems involved with fire inspections and barred suits based on this activity. Still other states have generally barred suits, but have legislated a specific list of torts on which liability can be based. It will be helpful to discuss some of the distinctions which courts have found to support or distinguish from governmental immunity.

The first distinction is that of governmental vs. proprietary function. In the case of *Perkins* v *City of Lawrence*, 177 Kan. 612, 281 P. 2nd 1077 (1955), the Supreme Court of Kansas indicated that in the maintenance and operation of its fire department, a city is acting in its governmental capacity and is not liable in damages for negligence of officers or employees in performance of duties pertaining to fire departments. This seems to be a broad sweep, but the real question is what activities of the fire department are considered governmental and what are considered proprietary. In a 1964 case, *Andrade* v *City of Albuquerque*, 74 N.M. 534, 395 P. 2nd 597, it was found that the installation of the fire department alarm system was sufficiently governmental to bar recovery by a pedestrian injured by a falling cable. This result was decided even though it was not a member of the city fire service who was stringing the cable, but rather a contractor hired by the fire department. From this holding, it would seem that most all fire department activities are governmental.

However, the 1979 case of *Berkowski* v *Hall*, 282 N.W. 2nd 813, may indicate a trend towards limiting the scope of what is considered governmental activity. This case allowed a plaintiff to maintain a suit against a municipality based on alleged negligent fire department operation of emergency medical services. The Court of Appeals of Michigan felt that the operation of these EMS units was a proprietary function since they were more like the operation of a general hospital than a mental hospital; thus, a suit could be maintained. The Court had used a "governmental essence" test in determining the question of whether the activity was governmental or proprietary. Given the growth of such services, this case may have wide significance in the future.

The case of *Gianechini* v *City of New Orleans*, 410 S. 2nd 292 (1982) is noteworthy. This case involved a death after receipt of emergency medical services and was based on a particular Louisiana statute giving immunity, except in cases of gross negligence. It may not have wide application in the context of governmental vs. proprietary activity, but might be reviewed for a court's discussion of the value and effect of these services in general, and CPR in particular.

An interesting distinction from strict governmental immunity involves the time and place of the injurious activity. The case of *D'Eustachio* v *City of Beverly*, 177 N.J. Supp. 566, 427 A. 2nd 127 (1979), involved two volunteer fire companies which, in the course of a training drill, did serious water damage to a landowner's property. The Court found that the nature of the companies and their relationship to the city made them public employees, such that the city could not deny any responsibility. At the same time, as public employees, they would seem to come under a statute giving immunity for fire service activities "for the control or extinguishment of fires." The Court chose to read this conservatively and applied it only to the actual scene of a fire. Based on this reading, a suit was allowed and, since liability could be found against the individual fire companies, it would be allowed against the city.

A distinction of wider application than that used in *D'Eustachio* would be one involving discretionary vs. ministerial function. The general rule here is that there is no liability for acts causing injury which are found to be planning or discretionary functions of fire officers, but liability can be imposed for negligent ministerial acts. The Michigan case of *Stemen* v *Coffman*, 92 Mich. App. 595, 285 N.W. 2nd 305 (1979), involved a fire in a multiple-dwelling unit. Suit was brought claiming negligence against a housing inspector, the fire inspector, and the fire chief. The case was dismissed by the trial court, and the dismissal was upheld by the Court of Appeals because they felt that the activities performed were discretionary, not ministerial; thus, no liability could attach.

A similar case that reached an opposite result, would be that of *Jones* v *City of Longwood*, 404 So. 2nd 1083 (1981). This case involved a child killed when a heavy cabinet fell on her while she was playing in an abandoned building. A city ordinance required periodic inspections by the building inspector and fire chief. The trial court granted Summary Judgment in favor of the city, but this was reversed. The Appeals Court of Florida found that the required inspection activities were of an operational level and, therefore, liability could attach if it was found that the inspections were carried out in a negligent fashion.

Perhaps the most important and often-used principle that has been used to bar negligent actions is the "public duty doctrine." The underlying principle here is that, even if a duty is breached by a public officer or employee, there can be no right to recovery by the insured party unless he/she can show a breach of a duty individually owed as opposed to the duty which was owed to the public at large — duties owed to the public at large being subject to redress only in a public action. One of the first cases to use this rationale to deny recovery was that of *Matyka* v. *City of Amsterdam*, 15 N.Y. 2nd 134, 204 N.E. 2nd 635, 256 N.Y.S. 2nd 595 (1965). This case involved a residential fire that started in an oil-filled heater that had been inspected two months previously. The New York Court of Appeals noted that strict governmental immunity had been abrogated by state statute so that could not be used as a defense by the city. The plaintiff, however, had to show that the city was under a particular duty to him as a member of a class for whose special benefit the statute requiring periodic inspections was enacted. Since the plaintiff in this case could not show this special benefit arising out of the inspection statute, recovery was denied.

The public vs. private duty doctrine has been the basis of numerous other holdings in favor of the city, among them, *Duran* v *City of Tucson*, 20 Ariz. App. 22, 509 P. 2nd 1059 (1973); *Dufrene* v *Guerino*, 343 So. 2nd. 1097 (1977); *Gordon* v *Holt*, 412 N.Y.S. 2nd 534 (1979); and *Cracraft* v *City of St. Louis Park*, 279 N.W. 2nd 801 (1979). This is not an exhaustive list; other jurisdictions have such cases.

Each of the mentioned distinctions, governmental vs. proprietary, discretionary vs. ministerial, and public vs. private duty, has, basically, revolved around some form of the governmental immunity defense. However, more and more states are totally abrogating this defense, either by statute or judicial decision. It is possible that the future will see fewer distinctions regarding municipal liability for the acts of fire officers and inspectors, thus, leaving the cities and towns more liable for suit as if they were private sector employers.

A 1976 case, *Adams* v *State*, 555 P. 2nd 235, in Alaska may be a key precedent in this emerging trend. This case evolved when a fire in 1970 at the Gold Rush Hotel in Anchorage, which killed 5 people, injured 17 others, including 1 fire fighter, and completely destroyed the hotel. Plaintiff sued, claiming a negligent fire inspection and failure by the state to act after this inspection when there was a known, hazardous condition. The trial court had decided that the state could not be held liable and had granted Summary Judgment. On appeal, the Supreme Court of Alaska reversed the decision and found that there could be liability.

In their decision, the Court reviewed the whole matter in great depth, and developed a well-reasoned rationale on which to base their decision. They took the position that once an inspection has been undertaken, the state has a duty to act reasonably under the common law and that, if the plaintiff could prove at the trial that the failure to warn of known hazards was negligence, and that such negligence was a cause of the fire, the plaintiff would be entitled to recover. By this holding, which is based solely on the common law, the Court chose not to reach the statutory obligation to inspect fire hazards. Under the reasoning of the decision, having made the inspection, the state had undertaken the duty to do so reasonably. The Court rejected the argument that a public duty does not give a private right of action, because their holding was based on a common law duty and therefore the argument did not apply. The "duty-to-all means a duty to no one" is a form of sovereign immunity which the legislature of the state had abrogated. The Court even discussed the discretionary vs. ministerial argument and found that the actions were not discretionary to give rise to this defense. Commenting on the discretionary vs. ministerial defense, they felt that while the basic policy decision to undertake an activity is immune, the execution of that decision is not.

Whether *Adams* v *State* will be the trend of the future is uncertain. Since the decision was made, the case has been cited and quoted in numerous other public employee liability questions. It has not been universally adopted but it is worthy of review for its final holding and for the detailed and well-written opinion.

Fire Service Publications

California Fireman
2701 K. St., Suite 1
Sacramento, CA 95816

California State Fire Marshal Newsletter
7171 Bowling Dr., Suite 800
Sacramento, CA 95823

Carolina Rural Fireman
P.O. Box 643
New Bern, NC 28560

Chicago Fire Fighter
54 W. Randolph St.
Chicago, IL 60601

The Chief
150 Nassau St.
New York, NY 10038

Code Red Fire Newsletter
10 Baldwin St.
Meriden, CT 06450

Combustion and Flame Combustion Institute
986 Union Trust Building
Pittsburgh, PA 15219

Consumer Product Flammability
265 W. State St.
Westport, CT 06880

Embers
701 Albert St.
Englewood, OH 45322

Enjine-Enjine
P.O. Box 450
Syracuse, NY 13206

Fire Chief
40 E. Huron St.
Chicago, IL 60611

Fire Control Digest
7620 Little River Turnpike
Annandale, VA 22003

Fire Engineering
875 Third Ave.
New York, NY 10022

Fire Engineering
23401 Aetna St.
Woodland Hills, CA 91367

Fire Fighters Assn. of Missouri Newsletter
P.O. Box 473
Columbia, MO 65201

Fire Fighters News
30500 Van Dyke St.
Room 600
Warren, MI 48093

Fire Journal®
National Fire Protection Association
Batterymarch Park
Quincy, MA 02269

Fire Lines
225 Broadway
New York, NY 10007

Fire Marshals' News Letter
c/o Ohio State Fire Marshal
8895 E. Main St.
Reynoldsburg, OH 43068

Fire News
National Fire Protection Association
Batterymarch Park
Quincy, MA 02269

Fire Prevention and Fire News
P.O. Box 381
Mandan, ND 58554

Fire Research Abstracts and Reviews
c/o Committee on Fire Research
National Academy of Sciences
2101 Constitution Ave. - JH-312
Washington, DC 20418

Fire Retardant Chemistry
265 W. State St.
Westport, CT 06880

Fire Service Information
Engineering Extension Service
Iowa State University
Ames, IA 50011

Fire Service Today®
National Fire Protection Association
Batterymarch Park
Quincy, MA 02269

Fire Station Digest
6830 - 26th St. NE
Seattle, WA 98115

Fire Technology
National Fire Protection Association
Batterymarch Park
Quincy, MA 02269

Fire Times
1100 N.E. 125th St.
North Miami, FL 33161

Fire and Security Directors
614 Superior Ave., W
Cleveland, OH 44113

Firehouse
515 Madison Ave.
New York, NY 10022

Fireman
P.O. Box 22051
Memphis, TN 38122

Firemen's Grapevine
2900 W. Temple St.
Los Angeles, CA 90026

Firemen's Monthly
P.O. Box 155
Spring Lake, NJ 07762

Flame-Free Newsletter
11803 Pine Belt Dr.
Cypress, TX 77429

Flammability Institute News Bulletin
4001 W. McNichols Rd.
Detroit, MI 48221

Florida Fireman
P.O. Box 968
Avon Lake, FL 33873

From the State Capitols — Fire Administration
321 Sunset Ave.
Asbury Park, NJ 07712

Georgia Firefighter
P.O. Box 1623
Decatur, GA 30030

Hose Line
P.O. Box 211
Martinsville, VA 24112

Hudson Valley Fireman
166 Main St.
Hudson Falls, NY 12839

Indiana Volunteer Fireman
P.O. Box 437
Crown Point, IN 46307

Industrial Fire and Security Report
P.O. Box 1067
Silver Spring, MD 20901

International Fire Chief
1329 - 18th St. NW
Washington, DC 20036

International Fire Fighter
1750 New York Ave. NW
Washington, DC 20006

Iowa Smoke Eater
P.O. Box 118
Pierce, NE 68767

Minnesota Fire Chief
276 E. Sixth St.
St. Paul, MN 55101

Minnesota Smoke Eater
P.O. Box 118
Pierce, NE 68767

National Assn. of Fire Investigators Newsletter
53 W. Jackson Blvd.
Chicago, IL 60604

Nebraska Smoke Eater
P.O. Box 118
Pierce, NE 68767

New England Fire and Rescue Magazine
16 Joslin St.
Providence, RI 02909

Northeastern Fire Fighter
P.O. Box 368
Ithaca, NY 14850

Oregon Fire Service Bulletin
c/o Oregon State Fire Marshal
103 Labor and Industries Building
Salem, OR 97310

South Dakota Fire Eater
c/o State Fire Marshal Department
Capitol Building
Pierre, SD 57501

Speaking of Fire
c/o International Fire Service Training Association
Oklahoma State University
Stillwater, OK 74078

Tarheel Firefighter
P.O. Box 643
New Bern, NC 28560

Tennessee Fireman
P.O. Box 90450
Nashville, TN 37209

Tennessee Fireman's Journal
P.O. Box 3
Columbia, SC 29202

Tenth Worst Killer Journal
Room 25
115 Southhampton St.
Boston, MA 02118

Virginia Fireman
105 Arrollton Dr.
Hamptom, VA 23366

Volunteer Fireman
Dalton, NY 14836

Vulcan Newsletter
Vulcan Hall
739 Eastern Parkway
Brooklyn, NY 11213

Western Fire Journal
9072 E. Artesia Blvd. - Suite 7
Bellflower, CA 90706

WNYF
c/o New York City Fire Department
110 Church St.
New York, NY 10017

EMS/EMT Publications

Annals of Emergency Medicine
3900 Capital City Blvd.
Lansing, MI 48906

Emergency
P.O. Box 159
Carlsbad, CA 92008

Emergency Alert
1730 S. Bumby Ave.
Orlando, FL 32806

Emergency Medical Services
12849 Magnolia Blvd.
N. Hollywood, CA 91607

Emergency Medicine
280 Madison Ave.
New York, NY 10016

EMS Communicator
400 Danbury Rd.
Wilton, CT 06897

Maryland Rescue Journal
P.O. Box 3052
Baltimore, MD 21229

New England Fire & Rescue Magazine
16 Joslin St.
Providence, RI 02909

North Carolina Emergency News
P.O. Box 553
Greenville, NC 27834

Rescue
1730 S. Bumby Ave.
Orlando, FL 32806

Trauma Line
Maryland State Ambulance and Rescue Association
P.O. Box 3052
Baltimore, MD 21229

Radio Frequencies for Major Metropolitan Cities and Areas

Key to Service Characteristics

Emergency Medical Service (EMS)

Service Provided

1: First Responder
2: BLS Transportation
3: ALS (paramedic)
4: ALS Transportation

Primary Source of Service

F: Fire Department
P: Police Department
S: Separate public agency
C: Private Ambulance
H: Hospital

Numbers (1,2,3,4) indicate type of service provided. Letters (F,P,S,C,H) indicate source of each service provided.

For example, "1F; 2–4S" means that the fire department is usually the first responder on medical emergencies; that a separate public agency provides BLS transportation, Advanced Life Support (ALS), and ALS transportation.

The following frequencies in the U.S. are used for voice communications and biomedical telemetry between EMS units in the field and hospital-based physicians:

Channel Name	Base Transmitter Frequency
Med 1	463.000
Med 2	463.025
Med 3	463.050
Med 4	463.075
Med 5	463.100
Med 6	463.125
Med 7	463.150
Med 8	463.150
	463.175

911 System

911: 911 in place
E911: 911 enhanced by certain data accompanying each 911 call. Two levels of such data are now generally tariffed:

Automatic Number Identification (ANI)—Caller's telephone number; and *Automatic Location Identification* (ALI)—Caller's Address. This data is displayed to the receiving 911 operator at the time of the call.

911P: 911 in planning
E911P: E911 in planning

Alarm Box System

BOXES: Unspecified type of alarm box system
BOX–1: Street/Master telegraph boxes
BOX–2: Street voice boxes
BOX–3: Street telegraph and voice boxes
BOX–4: Master boxes in buildings only
RF: Radio box system
BOX–R: Street boxes removed recently (date if known)

Computer-Aided Dispatch

CADS: Computer-Aided Dispatch
CAD–P: CAD in planning (implementation date if known)

PRIMARY CHANNEL USE

CHANNEL DESIGNATION	FREQUENCY	POP[1]	AREA	SERVICE CHARACTERISTICS[2]
Akron, OH		237	408	1,2C; 3,4F 911 BOX–1 CAD–P
F1	33.740	City Fire Dispatch		
F2	33.860	County Fire Dispatch		
Med 9	462.950	EMS Coordination		
Med 10	462.975	EMS Coordination		
F1	155.340	H. E. A. R. System		
F2	155.385	Private Ambulance		
Med Channels 1 thru 8		Medical Consultation/Control		
Alameda, CA		64	733	1F; 2C 911 BOX–R
1	154.130	Primary Fire Operations		
2	154.280	Mutual Aid (Statewide)		
3	155.400	Alameda County EMS		
Albuquerque, NM		325	99	1,3F; 2,4C 911 CAD–P
1	154.400	Primary Fire Operations		
2	154.160	Fire Prevention and Backup		
3	154.310	State Fire Communications		
Anaheim, CA		210	43	1,3F; 2,4C 911
1	46.26	Primary Operations		
2	46.06	County Mutual Aid		
3	46.48	Command		
4	46.42	Backup		
Anchorage, AK		173	927	1–4F 911 BOX–4
1	154.130	Primary Fire Operations		
2	154.175	Fireground/Paging/Drill		
3	154.445	Fireground command		
4	155.160	EMS		
5	154.250	Brush/Volunteers		

[1] Resident population × 1000; often different than the population served. For example, the resident population of Boston is 640,000; the daytime population is 1,500,000.

[2] See Key.

Anne Arundel County, MD		370	440	1–4F	CAD–P	
1	154.010	Dispatch of units				
2	154.340	Response of units				
3	154.175	Fireground/Tactical				
4	154.280	Mutual Aid				
5	154.295	Fireground Command				
	46.500	Administrative				
	154.830	Fireground/Tactical—Portable Only				
Austin, TX		345	128	1–4S	E911	CAD
1	453.100	Base/Mobile/Fireground				
2	453.150	Base/Mobile/Fireground				
3	453.500	Base/Mobile/Fireground				
4	453.775	Base/Mobile/Fireground				
5	453.900	Dispatch				
6	453.450	Administrative				
7	453.275	Tactical				
8	453.675	Tactical				
9	154.130	Mutual Aid				
Bakersfield, CA		300	8118	1F,C; 2–4C	E911–P	CAD
Blue	453.300	Operational and Dispatch				
Orange	453.450	Administrative/Backup				
Red	453.225	Interagency/Backup				
Yellow	453.375	Administrative/Backup				
Baltimore City, MD		786	86	1–4F	BOX–1	CAD
1	154.310	Primary Base/Mobile				
2	154.370	Fireground				
3	154.385	Fireground				
4	154.325	Fireground and Paging				
5	154.415	Fire/EMS Dispatch				
6	154.145	EMS Operations				
7	153.830	Portable/portable				
8	154.280	Mutual Aid				

CHANNEL DESIGNATION	FREQUENCY	POP[1]	AREA	SERVICE CHARACTERISTICS[2]
Baltimore County, MD		672	621	1–4F 911 CAD
1	46.46	Fire Dispatch		
2	46.28	EMS and Administrative		
3	46.52	Fireground (East)		
4	46.56	Fireground (West)		
	154.28	Mutual Aid		
Birmingham, AL		275	100	1,3F; 2,4C 911 CAD
	154.190	Fire Operations		
	155.340	EMS H. E. A. R. System		
Med 9	462.950	EMS Coordination		
Med 10	462.975	EMS Coordination		
Med Channels 1 thru 8		Medical Consultation/Control		
Boston, MA		640	46	1–4S 911 E911–P BOX–3
1	483.1625	Primary Base/Mobile		
2	483.1875	Fireground/Tactical		
3	483.2125	Fireground/Tactical		
4	483.2375	Administrative		
5	453.650	Station Alerting		
6	153.890	Paging; Subway Repeater		
7	154.220	Mutual Aid		
Tac 9	462.950	EMS Administrative/Tactical		
Tac 10	462.975	EMS Dispatch		
Med Channels 1 thru 8		Medical Consultation/Control		
Buffalo, NY		350	42	1F; 2–4C 911 BOXES
	154.190	Fire Operations		
	155.340	EMS H.E.A.R. System		

Calgary, Alberta		560	235	1F; 2–4S 911 BOX–R(1979)
1	413.7125	EMS Dispatch		
2	413.3375	Fire Dispatch		
3	413.6625	EMS Dispatch		
4	413.7875	Fire Dispatch		
Tac 5	413.1375	Fireground/Tactical		
Tac 6	413.4375	Fireground/Tactical		
Tac 7	413.5625	Fireground/Tactical		
Tac 8	413.8625	Fireground/Tactical		
Charlotte, NC		343	138	1FS; 2S 911
1	460.525	Fireground		
2	460.625	Fireground		
3	460.550	Fireground		
4	460.600	Fireground		
5	460.575	Fire Dispatch		
Chicago, IL		3200	954	1–4F E911 BOX–1R(1980) BOX–4 CAD–P
	154.130	Fire Operations—North Side		
	153.770	Fire Operations—South Side		
	154.220	Administrative		
	153.830	Fireground/Tactical		
	154.385	Fireground/Command		
	460.600	EMS Dispatch		
	460.625	EMS Mobile data terminals		
Med Channels 1 thru 8		Medical Consultation/Control		
Cincinnati, OH		383	76	1–4F BOX–1
	154.310	Primary Dispatch		
1	460.600	Fireground/Tactical		
	465.600	Fireground/Tactical		
	460.625	Fireground/Tactical		
2	465.625	Fireground/Tactical		
Med 1	463.000	Medical Consultation/Control		
Med 5	463.100	Medical Consultation/Control		
	153.830	Command/Disaster		

CHANNEL DESIGNATION	FREQUENCY	POP[1]	AREA	SERVICE CHARACTERISTICS[2]
Columbus, OH		565	183	1–4F BOX–2
1,2	154.310	Primary Fire Operations		
4	154.400	Administrative		
	155.340	EMS		
Corpus Christi, TX		231	841	1–4F BOX–RF
1	154.190	Primary Base/Mobile		
2	154.385	Station Alerting		
3	154.070	Mobile/Mobile		
5	154.995	Administrative		
6	462.950	EMS Dispatch		
7	462.975	Ambulance to Hospital Call-In		
8	463.175	Biomedical Telemetry		
9	463.100	Biomedical Telemetry		
10	463.025	Biomedical Telemetry		
11	463.150	Biomedical Telemetry		
Dallas, TX		904	378	1–4F CAD
1	154.070	Paging and Backup		
2	154.445	EMS Operations		
3	154.220	Fire Operations		
4	154.340	Fireground/Tactical		
6	465.575	Station Alerting		
Med Channels 1 thru 4		Medical Consultation/Control		
Dayton, OH		203	459	1–4F BOX–R CAD–P
1	154.430	Fire and EMS Dispatch		
2	154.430	Fire and EMS Tactical		
3	154.175	Fireground/Tactical		
4	154.280	Mutual Aid		
6	155.340	EMS/BLS Working (Primary)		
7	155.400	EMS/BLS Working		

8	155.325	EMS/BLS Working					
9	155.280	Statewide Hospital/Squad/Command					
10	155.805	Statewide Common Disaster					
Med 9	462.950	EMS Dispatch					
Med 10	462.975	EMS Command and Control					
Denver, CO		491	24	1FH:	2–4H	BOX–1RF	911
1	154.310	Base/Mobile Dispatching					
2	154.070	Pagers/Mobile/Multi-alarm Fires					
3	155.955	Siren Activation and Service Channel					
4	154.280	Mutual Aid					
Des Moines, IA		191	578	1,2F			
1	460.625	Fire Dispatch					
2	460.575	EMS					
3,4	460.600	Administrative/Fireground					
Detroit, MI		1200	139	1–4F	911	BOX–R*	
F 1,2	154.31	Primary Base/Mobile					
F 3,4	154.40	Fireground/Tactical					
	155.16	EMS					

*Of Detroit's 4,000 telegraph boxes, less than 900 remain. Of those, 170 are street boxes at firehouses or in the business district. The rest are master boxes in buildings.

Edmonton, Alberta		534	263	1–4S	911	CAD
1	413.1125	Fire Dispatch/Operations				
2	413.1625	Fire Dispatch/Operations				
3	413.7875	Fireground/Tactical				
4	413.8375	Fireground/Tactical				
5	413.8625	Fireground/Tactical				
6	413.9625	Fireground/Tactical				
7	413.0375	Data (Hard Copy Dispatch)				

CHANNEL DESIGNATION	FREQUENCY	POP[1]	AREA	SERVICE CHARACTERISTICS[2]
El Paso, TX		420	240	1F; 2–4S 911 BOX–R(1980)
1	154.325	Primary Fire Dispatch/Operations		
2	154.445	Administrative		
	453.750	Station Alerting		
Med 9	462.950	EMS Dispatch		
Med 1	463.000	Medical Consultation/Control		
Med 3	463.050	Medical Consultation/Control		
Med 4	463.070	Medical Consultation/Control		
Med 5	463.100	Medical Consultation/Control		
Fairfax, VA		19	399	1–4F 911 CAD–P
	46.080	Volunteer Tone Alerting		
1	460.575	Primary Dispatch		
2	460.600	Fire Marshal and EMS		
3	460.625	Mutual Aid and EMS (N. Virginia)		
	154.280	Mutual Aid (Metro. Washington area)		
	154.265	Mutual Aid (N. Virginia)		
Flint, MI		159	642	1–4F BOX–1
1	153.890	EMS/Fire Dispatch		
2	154.235	Administrative/Backup		
3	154.280	Mutual Aid		
4	155.160	County/City Paramedic Coordination		
Fort Worth, TX		400	240	1F; 2–4C BOX–R(1972) CAD–P(1984)
1	460.525	Tactical Support		
2	460.550	Fireground/Tactical (Primary)		
3	460.600	Fireground/Tactical (Secondary)		
4	460.650	Administrative/Tactical		
5	465.550	Fireground/Tactical (portables)		
Alarm	154.250	Fire Dispatch (tone alert)		
County	46.060	Mutual Aid		

Grand Rapids, MI		181	857	1P; 2C 911
	153.950	Mobile to Base		
	154.140	Base to Mobile		
	154.370	Area Fire Dispatch (Tone Alert)		
Halifax, NS		280	24.19	1FPH; 2–4H BOXES
1,2	413.3870	Primary Fire Operations		
3,4	413.8620	Secondary Fire Operations		
5	414.312	Administration		
Hamilton, Ontario		306	54	1FS; 2S 911 CAD–P
1	154.830	Township Fire Operations		
2	154.070	Ontario Fire Marshal		
3	154.830	City Fire Operations		
4	162.915	Mobile Repeaters		
	149.100	Provincial EMS		
	152.150	Hamilton-Wentworth EMS		
Hartford, CT		136	739	1FPC; 2C BOX–3
	154.310	Primary Base/Mobile		
	155.940	Administrative		
	153.830	Fireground/Tactical		
Honolulu City and County, HI		822	604	1FS; 2–4S 911 BOX–R(1980)
Control	154.220	Fire/Rescue Operations (metropolitan)		
Control	154.340	Fire/Rescue Operations (rural)		
Houston, TX		1900	566	1–4F E911–P BOX–1 CAD
F 6	460.525	EMS Dispatch		
F 7	460.550	EMS Backup		
F 8	460.575	Fire Dispatch		
F 9	460.625	Fireground/Backup		
Indianapolis, IN		505	81	1–4F 911 BOX–R(1978)
1	153.770	Fire Dispatch		
2	154.070	Unit to Unit		
3	154.175	Fireground/Tactical		

CHANNEL DESIGNATION	FREQUENCY	POP[1]	AREA	SERVICE CHARACTERISTICS[2]
Jacksonville, FL		600	844	1–4F BOX–R CAD
1	460.575	Primary Fire Operations		
2	460.600	Secondary Fire (Patched to Channel 5 for EMS)		
3,4	460.625	Fireground/Tactical		
5	462.950	EMS Dispatch (Primary)		
6	462.975	EMS Dispatch (Secondary)		
7	463.075	Medical Control/Consultation		
8	463.125	Medical Control/Consultation		
9	463.150	Medical Control/Consultation		
10	463.175	Medical Control/Consultation (Statewide)		
11	154.445	Station Alerting		
12	153.755	Civil Defense		
13	155.340	Hospital Disaster Coordination		
Jersey City, NJ		243	19	1P; 2–4S BOX–2
1	460.550	Dispatch/Tactical		
2	460.600	Dispatch/Tactical		
London, Ontario		86	25	1,2C 911
1	154.370	Fire Dispatch/Tone Alert/Tactical		
		Middlesex County Mutual Aid		
2	154.070	Administrative/Fireground/Tactical (Ontario Fire Marshal)		
3	154.950	Administrative/Fire Dispatch/Tone Alert/Tactical		
4	154.635	Fireground/Tactical		
	160.095	Fireground Repeater		
1	414.2125	Fireground Repeater (Backup)		
3	414.6625	Fireground Repeater (Backup)		

Los Angeles City, CA		2900	454	1–4F	E911–P(1984)	CAD
1	506.3125	Fireground/Tactical—Div. 1				
2	506.5375	Fireground/Tactical—Div. 2				
3	506.9125	Fireground/Tactical—Div. 3				
4	506.1375	Rescue Ambulances—Metro Area				
5	506.6375	Fireground/Tactical (Brush)				
6	507.0125	Fireground/Tactical (Brush)				
7	33.700	Fire Operations—Metro Area				
8	33.820	Fire Operations—Valley Area				
9	33.940	Special Operations (Brush)				
10	33.90,48,86	Mobile Digital Status System				
11	33.600	Command				
12	33.560	Command				
13	33.520	Command (Car-to-Car)				
HEAR 1	155.280	EMS/Hospital				
HEAR 2	155.340	EMS/Hospital				
Med Channels 1 thru 8		Medical Consultation/Control				
Los Angeles County, CA		2269	2190	1,3F; 2,4C	E911–P(1984)	CAD
1	154.430	Fire/EMS Dispatch—Los Angeles Basin				
2	154.340	Fire/EMS Dispatch and Tactical—San Gabriel Valley				
3	154.400	Fire/EMS Dispatch and Tactical—Antelope Valley, Newhall-Saugus, Malibu				
Tac 5	154.295	Fireground/Tactical—Los Angeles Basin				
Tac 6	154.280	Statewide Mutual Aid				
Med Channels 1 thru 8		Medical Consultation/Control				
Miami, FL		365	395	1F; 2C; 3–4F	E911	CAD
A	453.100	Fire Dispatch				
B	453.150	Fireground/Tactical				
C	453.200	Fire Administrative				
D	453.425	EMS Dispatch				
	453.325	EMS Administrative				
	453.900	Mobile Telephone				
	851.2875	Mobile Status/Display Terminals				

CHANNEL DESIGNATION	FREQUENCY	POP[1]	AREA	SERVICE CHARACTERISTICS[2]
Milwaukee, WI		633	96	1F; 2C; 3–4F BOX–1
1	154.130	Fire Dispatch		
2	153.950	Fire Mobile/Portable		
3	153.770	EMS Mobile/Portable		
4	154.385	EMS Dispatch		
5	153.830	Fireground Portable		
6	154.295	Mutual Aid		
Med Channels 1 thru 8		Medical Consultation/Control		
Minneapolis, MN		375	58	1F; 2–4S E911 CAD
1,2	154.340	Primary Fire Operations		
3	154.235	Administrative/Backup		
4	154.295	Mutual Aid		
5	153.830	Portable/Portable Statewide		
Mississauga, Ontario		350	117	1FPS; 2S CAD–P(1983)
1	154.950	Primary Fire Operations		
2	154.235	Greater Alarms/Backup		
	158.925	Mobile Repeater		
	414.5875	Station Alerting		
	154.070	Mutual Aid		
Mobile, AL		200	1240	1,3F; 2,4C 911 BOX–RF
	160.350	Fire Operations		
Montgomery County, MD		579	495	1–4F 911 CAD–P
2	154.160	Primary Fire Operations		
1	153.950	Fireground		
3	154.280	Mutual Aid		
	462.950	EMS Intra-Jurisdiction		
Med 2	463.025	Medical Consultation/Control		

Montreal, Quebec		121	68	EMS*	BOX–R(1979)		
10–51	412.7625	Primary Fire Dispatch					
10–52	412.4875	Administrative					
10–53	413.2625	Fireground/Tactical					

*Provided by a separate provincial agency. Four nurses and one physician screen EMS calls at dispatch point. Responses by physicians in cars and EMTs in ambulances are tailored to the medical emergency.

Nashville, TN		480	530	1–4F	911	BOX–R	
1	460.600	Station Alerting					
2	460.575	Mobile/Base					
3	460.625	Mobile/Base					
4	458.950	Fireground/Tactical					
5	458.900	Fireground/Tactical					
6	154.445	Ambulance and Rescue*					
7	155.205	Base to Ambulance*					
8	155.280	Hospital to Hospital*					
9	155.340	Ambulance to Hospital*					

*Tennessee Statewide EMS Network

Newark, NJ		325	24	1–2S	911	BOX–1	
	154.13	Fire Operations					
New Orleans, LA		600	364	1–4P	BOX–2	CAD	
A	453.150	Digital					
B	460.575	Fire Dispatch					
FG1	460.600	Fireground/Tactical					
FG2	460.625	Fireground/Tactical					
New York City, NY		7100	300	1–4S	911	BOX–3	CAD
1	154.430	Fire Operations—Citywide					
2	154.250	Fire Operations—Queens					
3	154.370	Fire Operations—Brooklyn					
4	154.250	Fire Operations—Manhattan					
5	154.190	Fire Operations—Bronx, Richmond					
	153.830	Portable/Portable					

CHANNEL DESIGNATION	FREQUENCY	POP[1]	AREA	SERVICE CHARACTERISTICS[2]
Norfolk, VA		280	63	1F; 2–4S 911 CAD
1	154.190	Fire Dispatch		
2	154.235	Fireground/Tactical		
3	154.295	Mutual Aid		
	462.950	EMS Dispatch		
Oakland, CA		379	53	1F; 2–4C 911 BOX–R(1978)
1	153.785	Fire Dispatch		
2	154.355	Fireground		
	154.265	Portable/Portable (simplex)*		
3	154.295	Portable/Mobile (simplex)*		
4	154.280	Base/Mobile/Portable (simplex)*		
5	154.295	Portable Repeaters; Subway Repeater*		

*Statewide Mutual Aid (FIREMARS)

CHANNEL DESIGNATION	FREQUENCY	POP[1]	AREA	SERVICE CHARACTERISTICS[2]
Oklahoma City, OK		390	335	1,3F; 2–4S CAD
1	453.150	Backup Fireground/Dispatch		
2	453.350	Primary Fireground/Dispatch		
3	453.600	Primary Fireground/Dispatch		
4	453.300	Mutual Aid		
	153.890	Mutual Aid		
	155.055	Station Alerting (voice)		
	952.200	Station Alerting (printers)		
Omaha, NE		333	92	1–4F 911
1	154.190	Primary Base/Mobile		
2	154.010	Administrative		
3	153.950	Fireground/Tactical		
4	39.820	EMS Dispatch		
Med Channels 1 thru 8		Medical Consultation/Control		

Philadelphia, PA		1688	130	1–4F	911	BOX–1	CAD–P
1	154.235	Fire Operations—South					
2	153.950	Greater Alarms					
3	154.145	Fire Operations—North					
4	153.830	Fireground Portables					
5	153.950	Fireground Portables					
6	170.150	Rescue/EMS					
7	47.540	Hospital Alerting					
Phoenix, AZ		810	330	1,3F; 2,4C	E911–P		CAD
1	154.190	Dispatch					
2	154.250	East					
3	154.070	West					
4	154.280	Inter-Agency					
5	153.830	Fireground					
6	154.310	Glendale					
7	154.145	Tempe					
8	153.770	Tempe					
UHF	460.575	Administrative					
MDT	852.4625	Mobile Data Terminals					
Med 3	463.050	Medical Consultation/Control					
Med 6	463.125	Medical Consultation/Control					
Med 7	463.150	Medical Consultation/Control					
Med 8	463.175	Medical Consultation/Control					
Med 9	462.950	EMS Coordination					
Quebec City, Quebec		186	30	1–4C		BOX–R	
	154.250	Fire Operations					
	155.520	Administrative					
	154.340	Allied Services/Paging					
Richmond, VA		219	229	1–2FC; 3–4F	911	BOX–R(1981)	CAD
1	453.750	Fire Dispatch and Operations					
2	453.650	Administrative and Special Operations					
3	453.300	Fireground/Tactical					
4	154.130	Fire Dispatch (tone alert)					

CHANNEL DESIGNATION	FREQUENCY	POP[1]	AREA	SERVICE CHARACTERISTICS[2]
Rochester, NY		225	31	1FC; 2–4C E911 BOXES CAD
1	154.130	City Fire Dispatch		
2	154.250	City/County Work Channel		
3	154.385	County Work Channel—East side		
4	153.830	Portable/Portable		
5	154.310	County Fire Dispatch		
6	154.340	County Work Channel—West side		
	155.295	County EMS Dispatch		
	155.340	Hospital/Ambulance		
St. Paul, MN		287	55	1–4F 911 BOX–R CAD–P(1984)
1	154.130	Fire/EMS Dispatch		
2	154.010	EMS Communications		
Sacramento, CA		275	975	1F; 2C BOXES
1	153.890	Base/Mobile		
2	153.950	Base/Mobile		
3	154.190	Country Fire Operations		
4	154.280	Statewide Mutual Aid		
Salt Lake City, UT		250	526	1FC; 2,4C; 3F 911 BOX–1 and RF CAD
1	154.430	Base/Mobile		
2	154.310	Base/Mobile		
3	154.340	Fireground/Tactical		
	453.200	Mobile Data Terminals		
	154.415	Base/Mobile—Riverton City Fire Department		
	154.385	Base/Mobile—Sandy City Fire Department		
	460.625	Base/Mobile—West Valley City Fire Department		
	154.280	Base/Mobile—State Fire Coordinator		
St. Petersburg, FL		250	58	1,3F 911 BOX–R
1	154.070	Fire/EMS Dispatch		
2	154.205	Administrative/Fire Prevention		

3	465.575	Nozzle/Pump operators						
4	154.430	Mutual Aid						
San Antonio, TX		750	267	1–4S	911	CAD–P		
1	154.430	Fire Dispatch/Fireground Tactical						
2	154.355	Fire Prevention/Administrative						
3	155.220	EMS Dispatch/Administrative						
4	155.340	EMS Medical/Hospital (Voice)						
BMR 1	453.700	EMS (Portable Voice) Clinical						
BMR 2	453.750	EMS (Portable Voice) Clinical						
BMR 3	453.850	EMS (Portable Voice) Clinical						
Telemetry 1	463.000	Biomedical Telemetry with voice						
Telemetry 2	463.025	Biomedical Telemetry with voice						
Telemetry 3	463.050	Biomedical Telemetry with voice						
San Francisco, CA		678	45	1–4S	911	BOXES	CAD	
1	491.3525	Base/Mobile						
2	491.5625	Base/Mobile						
3	491.7625	Base/Mobile						
4	492.1625	Fireground/Tactical						
5	492.1875	Administrative						
San Jose, CA		680	212	1F;	2–4C	BOX–1R	BOX–4	CAD
14	154.280	Mutual Aid						
15	154.010	Primary Dispatch						
16	155.880	Fireground/Tactical						
Seattle, WA		475	98	1–4F	911	CAD		
	453.800	Fire/EMS Dispatch						
	453.600	Fireground/Tactical						
	453.700	EMS Administrative/Tactical						
Shreveport, LA		205	899	1F;	2C			
1	154.310	Secondary Fire Operations						
2	154.445	Administrative						
3	154.355	Primary Fire Operations						
4	154.400	Dispatch/Administrative						

CHANNEL DESIGNATION	FREQUENCY	POP[1]	AREA	SERVICE CHARACTERISTICS[2]
Springfield, MA		152	619	1,2C 911 BOXES
	154.400	Fire Operations		
Tampa, FL		300	84	1,2S; 3,4F BOX–R(1981) CAD
1	154.340	Primary Fire Operations		
2	154.220	Greater Alarms		
Med 7	463.150	Medical Consultation/Control		
Tucson, AZ		342	102	1–4F 911 BOX–4RF
F–1	453.100	Fire Suppression		
F–2	453.200	Fire Suppression		
F–3	453.600	Fire Suppression		
F–4	453.400	Administration		
F–9	460.575	Dispatch		
	154.280	Mutual Aid		
M–1	463.000	EMS Telemetry		
M–4	463.075	EMS Telemetry		
M–6	463.125	EMS Telemetry		
M–8	463.175	EMS Telemetry		
M–3	463.050	EMSCOM (Statewide)		
M–9	462.950	Inter-Hospital		
M–10	462.975	EMS Dispatch		
Toronto, Ontario		595	241	1–4S 911
1	411.9875	Base/Mobile		
2	411.7875	Fireground/Tactical		
3	417.6625	Mobile Repeater		
4	411.8625	Fireground/Tactical		
5	417.7125	Mobile Repeater		
6	412.8125	Fire Marshal		
7	412.3125	Administrative		
Dispatch 1	414.7625	Fire Dispatch (tone alert)		
Dispatch 2	415.3125	Fire Dispatch (tone alert)		

Vancouver, BC		410	44	1F; 2–4S 911 BOX–1R, BOX–4
1	151.505	Primary Fire Operations		
2	150.635	Fireground		
	164.490	EMS (Provincial)		
Washington, DC		635	693	1–4F 911 BOX–3 CAD
	154.190	Fire Dispatch		
	154.235	Fireground/Tactical		
	154.205	Fireground/Tactical/Pager		
	154.280	Mutual Aid		
	33.060	EMS Dispatch/Tactical/Administrative		
Med Channels 1 thru 8		Medical Consultation/Control		
Winnipeg, Manitoba		556	235	1FS; 2S 911 BOX–R(1980) CAD
1	413.1625	Primary Fire Operations		
2	413.0125	Fireground/Tactical		
3	413.4125	Fireground/Tactical		
4	413.6250	Fireground/Tactical		
Wichita, KS		280	91	1F; 2–4S 911
A	154.415	Fireground/Tactical		
B	154.190	Administrative/Fireground		
Worcester, MA		161	1509	1FP; 2–4H 911 BOX–4
F1,2	460.525	Primary Fire Operations		
F3,4	460.575	Administrative/Fireground/Paging		
	33.860	Fire Prevention/Maintenance		
	33.700	Mutual Aid—North County		
	33.620	Mutual Aid—South County		
Yonkers, NY		195	21	1P; 2C BOX–R(1980)
1	46.500	Primary Base/Mobile		
2	46.260	Mutual Aid		
	465.600	Fireground/Tactical—Portables		

911 System

911 System in Place

Akron, OH	237	408	1,2C; 3,4F 911 BOX–1 CAD–P
Albuquerque, NM	325	99	1,3F; 2,4C 911 CAD–P
Anaheim, CA	210	43	1,3F; 2,4C 911
Anchorage, AK	173	927	1–4F 911 BOX–4
Birmingham, AL	275	100	1,3F; 2,4C 911 CAD
Boston, MA	640	46	1–4S 911 E911–P BOX–3
Buffalo, NY	350	42	1F; 2–4C 911 BOX
Calgary, Alberta	560	235	1F; 2–4S 911 BOX–R(1979)
Charlotte, NC	343	138	1FS; 2S 911
Denver, CO	491	24	1FH; 2–4H BOX–1RF 911
Detroit, MI	1200	139	1–4F 911 BOX–R
Edmonton, Alberta	534	263	1–4S 911 CAD
El Paso, TX	420	240	1F; 2–4S 911 BOX–R(1980)
Fairfax, VA	19	399	1–4F 911 CAD–P
Grand Rapids, MI	181	857	1P; 2C 911
Hamiliton, Ontario	306	54	1FS; 2S 911 CAD–P
Honolulu City and County, HI	822	604	1FS; 2–4S 911 BOX–R(1980)
Indianapolis, IN	505	81	1–4F 911 BOX–R(1978)
London, Ontario	86	25	1,2C 911
Mobile, AL	200	1240	1,3F; 2,4C 911 BOX–RF
Montgomery County, MD	579	495	1–4F 911 CAD–P
Nashville, TN	480	530	1–4F 911 BOX–R
Newark, NJ	325	24	1–2S 911 BOX–1
New York City, NY	7100	300	1–4S 911 BOX–3 CAD
Norfolk, VA	280	63	1F; 2–4S 911 CAD
Oakland, CA	379	53	1F; 2–4C 911 BOX–R(1978)
Omaha, NE	333	92	1–4F 911
Philadelphia, PA	1688	130	1–4F 911 BOX–1 CAD–P
St. Paul, MN	287	55	1–4F 911 BOX–R CAD–P(1984)

Salt Lake City, UT	250	526	1FC; 2,4C; 3F 911 BOX–1 and RF CAD
St. Petersburg, FL	250	58	1,3F 911 BOX–R
San Antonio, TX	750	267	1–4S 911 CAD–P
San Francisco, CA	678	45	1–4S 911 BOXES CAD
Seattle, WA	475	98	1–4F 911 CAD
Springfield, MA	152	619	1,2C 911 BOXES
Tucson, AZ	342	102	1–4F 911 BOX–4RF
Toronto, Ontario		595	241 1–4S 911
Vancouver, BC	410	44	1F; 2–4S 911 BOX–1R, BOX–4
Washington, DC	635	693	1–4F 911 BOX–3 CAD
Winnipeg, Manitoba	556	235	1FS; 2S 911 BOX–R(1980) CAD
Wichita, KS	280	91	1F; 2–4S 911
Worcester, MA	180	38	1FP; 2–4H 911 BOX–4
		TOTAL	42

E911 System in Place

Austin, TX	345	128	1–4S E911 CAD
Alameda, CA	64	733	1F; 2C E911 BOX–R
Chicago, IL	3200	954	1–4F E911 BOX–1R(1980) BOX–4 CAD–P
Miami, FL	365	395	1F; 2C; 3–4F E911 CAD
Rochester, NY	225	31	1FC; 2–4C E911 BOXES CAD
		TOTAL	5

E911–P System in Planning

Bakersfield, CA	300	8118	1F,C; 2–4C E911–P CAD
Baltimore County, MD	672	621	1–4F E911–P CAD
Boston, MA	640	46	1–4S 911 E911–P BOX–3
Houston, TX	1900	566	1–4F E911–P BOX–1 CAD
Los Angeles City, CA	2900	454	1–4F E911–P(1984) CAD
Los Angeles County, CA	2269	2190	1,3F; 2,4C E911–P(1984) CAD
Phoenix, AZ	764	9155	1,3F; 2,4C E911–P CAD
		TOTAL	7

Alarm Box System

BOX

Akron, OH	237	408	1,2C; 3,4F 911 BOX–1 CAD–P
Anchorage, AK	173	927	1–4F 911 BOX–4
Baltimore City, MD	786	86	1–4F BOX–1 CAD
Boston, MA	640	46	1–4S 911 E911–P BOX–3
Buffalo, NY	350	42	1F; 2–4C 911 BOX
Corpus Christi, TX	231	841	1–4F BOX–RF
Dayton, OH	203	459	1–4F BOX–R CAD–P
Denver, CO	491	24	1FH; 2–4H BOX–1RF 911
Houston, TX	1900	566	1–4F 911–P BOX–1 CAD
Mobile, AL	200	1240	1,3F; 2,4C 911 BOX–RF
Newark, NJ	325	24	1–2S 911 BOX–1
New Orleans, LA	600	364	1–4P BOX–2 CAD
New York City, NY	7100	300	1–4S 911 BOX–3 CAD
Philadelphia, PA	1688	130	1–4F 911 BOX–1 CAD–P
Rochester, NY	225	31	1FC; 2–4C E911 BOXES CAD
Salt Lake City, UT	250	526	1FC; 2,4C; 3F 911 BOX–1 and RF CAD
San Francisco, CA	678	45	1–4S 911 BOXES CAD
San Jose, CA	680	212	1F; 2–4C BOX–1R BOX–4 CAD
Springfield, MA	152	619	1,2C 911 BOXES
Tucson, AZ	342	102	1–4F 911 BOX–4RF
Vancouver, BC	410	44	1F; 2–4S 911 BOX–1R BOX–4
Washington, DC	635	693	1–4F 911 BOX–3 CAD
Worcester, MA	180	38	1FP; 2–4H 911 BOX–4
		TOTAL	23

BOX–R

Alameda, CA	64	733	1F; 2C 911 BOX–R
Calgary, Alberta	560	235	1F; 2–4S 911 BOX–R(1979)
Chicago, IL	3200	954	1–4F E911 BOX–1R(1980) BOX–4 CAD–P

Dayton, OH	203	459	1–4F BOX–R CAD–P
Detroit, MI	1200	139	1–4F 911 BOX–R
El Paso, TX	420	240	1F; 2–4S 911 BOX–R(1980)
Fort Worth, TX	400	240	1F; 2–4C BOX–R(1972) CAD–P(1984)
Honolulu City and County, HI	822	604	1FS; 2–4S 911 BOX–R(1980)
Indianapolis, IN	505	81	1–4F 911 BOX–R(1978)
Montreal, Quebec	121	68	EMS[1] BOX–R(1979)
Nashville, TN	480	530	1–4F 911 BOX–R
Oakland, CA	379	53	1F; 2–4C 911 BOX–R(1978)
Quebec City, Quebec	186	30	1–4C BOX–R
St. Paul, MN	287	55	1–4F 911 BOX–R CAD–P(1984)
St. Petersburg, FL	250	58	1,3F 911 BOX–R
San Jose, CA	680	212	1F; 2–4C BOX–1R BOX–4 CAD
Tampa, FL	300	84	1,2S; 3,4F BOX–R(1981) CAD
Vancouver, BC	410	44	1F; 2–4S 911 BOX–1R, BOX–4
Winnipeg, Manitoba	556	235	1FS; 2S 911 BOX–R(1980) CAD
Yonkers, NY	195	21	1P; 2C BOX–R(1980)
		TOTAL	20

Computer-Aided Dispatch System

CAD

Austin, TX	345	128	1–4S E911 CAD
Bakersfield, CA	300	8118	1F,C; 2–4C E911–P CAD
Baltimore City, MD	786	86	1–4F BOX–1 CAD
Baltimore County, MD	672	621	1–4F 911 CAD
Birmingham, AL	275	100	1,3F; 2,4C 911 CAD
Dallas, TX	904	378	1–4F CAD
Edmonton, Alberta	534	263	1–4S 911 CAD
Houston, TX	1900	566	1–4F 911–P BOX–1 CAD
Los Angeles City, CA	2900	454	1–4F 911–P(1984) CAD
Los Angeles County, CA	2269	2190	1,3F; 2,4C 911–P(1984) CAD
Miami, FL	365	395	1F; 2C; 3–4F E911 CAD
Minneapolis, MN	375	58	1F; 2–4S 911 CAD
New Orleans, LA	600	364	1–4P BOX–2 CAD

New York City, NY	7100	300	1–4S 911 BOX–3 CAD
Norfolk, VA	280	63	1F; 2–4S 911 CAD
Oklahoma City, OK	390	335	1,3F; 2–4S CAD
Phoenix, AZ	764	9155	1,3F; 2,4C 911–P CAD
Rochester, NY	225	31	1FC; 2–4C E911 BOXES CAD
Salt Lake City, UT	250	526	1FC; 2,4C; 3F 911 BOX–1 and RF CAD
San Francisco, CA	678	45	1–4S 911 BOXES CAD
San Jose, CA	680	212	1F; 2–4C BOX–1R BOX–4 CAD
Seattle, WA	475	98	1–4F 911 CAD
Tampa, FL	300	84	1,2S; 3,4F BOX–R(1981) CAD
Washington, DC	635	693	1–4F 911 BOX–3 CAD
Winnipeg, Manitoba	556	235	1FS; 2S 911 BOX–R(1980) CAD
		TOTAL	25
CAD–P			
Akron, OH	237	408	1,2C; 3,4F 911 BOX–1 CAD–P
Albuquerque, NM	325	99	1,3F; 2,4C 911 CAD–P
Anne Arundel County, MD	370	440	1–4F CAD–P
Chicago, IL	3200	954	1–4F E911 BOX–1R(1980) BOX–4 CAD–P
Dayton, OH	203	459	1–4F BOX–R CAD–P
Fairfax, VA	19	399	1–4F 911 CAD–P
Fort Worth, TX	400	240	1F; 2–4C BOX–R(1972) CAD–P(1984)
Hamilton, Ontario	306	54	1FS; 2S 911 CAD–P
Mississauga, Ontario	350	117	1FPS; 2S CAD–P(1983)
Montgomery County, MD	579	495	1–4F 911 CAD–P
Philadelphia, PA	1688	130	1–4F 911 BOX–1 CAD–P
St. Paul, MN	287	55	1–4F 911 BOX–R CAD–P(1984)
San Antonio, TX	750	267	1–4S 911 CAD–P
		TOTAL	13

Hazardous Materials Disaster Checklist

Pre-Disaster Period

1. Conduct hazard analysis survey:
    a. Transportation modes
        1. Air
        2. Rail
        3. Water
        4. Pipeline
    b. Fixed facilities
        1. Factories
        2. Bulk storage
        3. Shipping and transfer
2. Conduct a survey of hazardous materials:
    a. Location
    b. Type
    c. Quantity
3. Evaluate resources available for dealing with specific locations and classes (flammable gases, corrosives, etc.) of hazardous materials.
4. Refer to transportation checklist that follows this checklist for suggested surveys of transportation modes.
5. Determine deficiencies in individual department operating procedures.
6. Develop hazardous materials training programs.
7. Develop standard operating procedures for hazardous materials incidents.
8. Establish mutual aid agreements with industries for:
    a. Special fire protection
    b. Suppression agents
    c. Special container patch kits
    d. Technical experts
    e. Spill control and clean-up equipment personnel
9. Develop pre-emergency response plans for potential transportation incidents and fixed facilities. Consider:
    a. Quantity of hazardous materials involved
    b. Health problems
    c. Fire danger
    d. Reactivity with suppression agents
    e. Potential dispersion areas
    f. Life, property, and environmental exposures
    g. Control/shutoff valve locations
    h. Special equipment required

Disaster Period

1. Determine the presence of hazardous materials.
   Consider:
    a. Transportation vehicles
    b. Dumps/waste sites
    c. Construction areas
    d. Fixed facilities
2. Estimate the potential harm to life, property, and the environment.
   Consider:
    a. Container size
    b. Shape
    c. Pressure
    d. Quantity

3. Choose a response objective and consider options. Protect life exposure as necessary. Consider:
   a. Intervention for immediate life-threatening rescue, if required.
   b. Withdrawal from area for identification of material involved and further assessment.
   c. Total withdrawal and evacuation to an estimated safe area.
4. Identify the material involved.
   Look for:
   a. Use levels
      1. Industrial sites (higher concentration potential)
      2. Home use (weaker concentrations.
   b. Containers
      1. Sizes
      2. Shapes
      3. Configurations
   c. Container marking systems
      1. Special color codings
      2. Placards/labels (D.O.T., NFPA 704, United Nations Number)
      3. Stenciled tank identification numbers
      4. Company signs, product names
   d. Documents
      1. Waybill
      2. Consist
      3. Invoices
      4. Supply/stock inventory lists
5. Contact manufacturer, shipper, etc., as required by contacting the Chemical Transportation Emergency Center (CHEMTREC 800-424-9300).
6. Re-evaluate emergency with new information.
7. Monitor progress throughout the incident.

Post-Disaster Period

1. Conduct medical evaluation of personnel as necessary.
2. Evaluate resources, inventory supplies, equipment damage.
3. Criticize emergency operations.
4. Review, revise, and update standard operating procedures and disaster plan mutual aid agreements as required.
5. Implement training program for correcting deficiencies.

Transportation Disaster Checklist

Pre-Disaster Period

1. Conduct hazard analysis by surveying:
   a. Types of transportation in the jurisdiction
      1. Aircraft
      2. Boat/ship
      3. Passenger train
      4. Subway
      5. Bus
   b. Examine transportation routes
      1. Aircraft flight patterns
      2. Aircraft final approach patterns to local airports
      3. Train routes, track locations

    4. Bus travel routes; consider school buses and through traffic
    5. Shipping lanes, barge traffic, canals
  c. Check transportation accident records to determine most frequent accident areas. Consult police department records, Federal Railroad Administration, U.S. Coast Guard Port Commander, Federal Aviation Administration.

2. Establish areas most likely to have a transportation disaster.
3. Examine fire department resources available for responding to a potential transportation disaster.

   Consider:

   a. Triage, emergency medical supplies for mass casualty. Will there be enough to treat 100 to 500 passengers?
   b. Morgue capabilities, body markers, tags, bags
   c. Special extrication equipment
   d. Underwater rescue capabilities
   e. Breathing apparatus capable of subway rescue, e.g., 45 to 60 minutes
   f. Communications for long-term field operation
4. Develop special operations plans as necessary for individual disaster types. Stress command post operations, communications, triage, and mutual aid.

Disaster Period

Implement disaster plan; conduct normal fire and rescue functions and adapt as the situation requires.

1. Establish clearly marked command post.
2. Establish necessary communications links with support agencies.
3. Implement triage, emergency medical operations plan.
4. Establish well-controlled perimeter and restrict unauthorized entry.
5. Preserve evidence for National Transportation Safety Board, U.S. Coast Guard, federal aviation investigators.
6. Hold briefings for the media on a regular basis. Implement a plan for a one-time tour of the accident scene.
7. Establish staging areas for mutual aid companies, helicopters, etc.
8. Maintain good field records, keep track of expenses, overtime, belongings of survivors, body part locations, etc.
9. Implement a body recovery plan for fatalities.

   Consider:

   a. Additional body bags
   b. Markers for body location, personal identification, investigation, morgue location
   c. Temporary morgues, e.g. refrigerated vehicles, closed areas
   d. Insect spray at the accident site during summer months

Post-Disaster Operations

1. Evaluate supply levels and resupply as necessary.
2. Hold a debriefing for fire and rescue personnel. Make psychological counseling available for personnel.
3. Criticize operations and develop recommendations for improvement.

Conflagration Checklist

Pre-Disaster Period

1. Conduct hazard analysis.
   a. Identify potential conflagration areas
   b. Conduct conflagration analysis

   - c. Evaluate fire suppression capabilities
   - d. Evaluate water supplies, fire flow capabilities
2. Establish mutual aid agreements with:
   - a. Fire departments for personnel and apparatus
   - b. Railroads for flatcar transportation of apparatus
   - c. Water tankers such as tank trucks, cement mixers
   - d. Demolition teams
3. Review laws, ordinances for the authority to demolish public property in emergencies.
4. Develop drafting areas at parks, streams, lakes, swimming pools.
5. Participate in long-range planning to eliminate conflagration hazards.
   - a. Construct fire breaks
   - b. Develop fire codes for preventing conflagration hazards.
6. Develop standard operating procedures for emergency response to conflagration.
7. Survey hose thread sizes and adapt as necessary.

Conflagration Potential Period

During periods of prolonged hot, dry weather with high winds:

1. Implement "no burning" laws.
2. Increase inspections in hazard areas.
3. Use fire patrols in hazard areas.
4. Increase response levels for reported fires in hazard areas.

Conflagration Period

1. Determine fire spread potential.
2. Call for additional resources as required *immediately*.
3. Contact water distribution facilities to increase water supply to affected areas.
4. Evacuate areas well in advance of the fire.
5. Request additional communications equipment as required.
6. Use helicopters for observations.
7. Maintain entry and exit control points.
8. Use natural fire breaks for defense lines well in advance of the fire.

Post-Conflagration Period

1. Inventory resources and restock as necessary.
2. Criticize fire service operations.
3. Review, revise, and update disaster plan and standard operating procedures as required.
4. Participate in fire engineering and code review as required.

Voluntary Organizations Active in Disaster Services and Guidelines for Developing Red Cross and Volunteer Organization Disaster Response Plans

The basic steps involved in working with the Red Cross and other voluntary groups are simple:

1. A written agreement and plan should be worked out which outlines Red Cross and fire department responsibilities and how they complement each other.
2. A system should be developed for notifying the nearest Red Cross chapter when families are in need of help or the fire department needs canteen or other assistance. Where feasible, this could be done through a municipal or county fire dispatch system. Red Cross chapters frequently are located in the county seat; therefore, it may

be desirable for the notification system to include names and phone numbers of Red Cross contact or liaison people who live within each fire department's jurisdiction. Perhaps the best way to initiate such arrangements, if they do not exist already, is through the county emergency service organizations.

3. One person in each department should be designated as an operational liaison to the Red Cross and other voluntary agencies. This could be a designated officer, a fire fighter who is a Red Cross-certified first-aid instructor, and thus, already a Red Cross volunteer or an officer of the auxiliary.
4. If there are specific arrangements made for utilization of fire houses or other department facilities by the Red Cross, the basis on which they are used and who assumes certain costs should be spelled out in writing. Whenever fire department facilities are used or the Red Cross and other voluntary groups work with the fire department or its auxiliary, the cooperative nature of the relief effort should be clearly identified so everyone is aware of it.
5. In planning for larger disasters, arrangements between the fire department and the Red Cross or other groups should be a part of the total community or county plan.

Voluntary Organizations Active in Disaster

American National Red Cross
Robert D. Vessey
National Director
Disaster Services
Washington, DC 20006
202-857-3722

American National Red Cross
Kathy Curry
Deputy Director
Disaster Services
Washington, DC 20006
202-857-3718

Ananda Marga
Ms. Kay Nelson
8700 Manchester Rd. #3
Silver Springs, MD 20901
301-588-6395

Ananda Marga
Universal Relief Team
854 Pearl St.
Denver, CO 80203
303-623-6602

Boy Scouts of America
James C. Langridge
P.O. Box 61030
Dallas/Ft. Worth Airport, TX 75261
214-659-2447

B'nai B'rith National Headquarters
Seymour C. Cohen
Disaster Relief Commission
1640 Rhode Island Ave., NW
Washington, DC 20036
202-857-6600

B'nai B'rith National Headquarters
Amy E. Lynn
Community Projects Coordinator
1640 Rhode Island Ave., NW
Washington, DC 20036
202-857-6580

Church of the Brethren Disaster Service
H. McKinley Coffman
Brethren Service Center
Box 188
New Windsor, MD 21776
301-635-6464 ext. 45

Church of the Brethren Disaster Service
R. Jan Thompson
Brethren Service Center
Box 188
New Windsor, MD 21776
301-635-6464 ext. 45

Christian Reformed World Relief Committee
C. Neil Molenaar
Director, Domestic Programs
2850 Kalamazoo Ave., SE
Grand Rapids, MI 49508
616-241-1696

Church World Service
John Schauer
Director Material Resources
475 Riverside Dr., Room 630
New York, NY 10027
212-870-2066

Church World Service
W. D. Dibrell
Domestic Disaster Coordinator
Box 188
New Windsor, MD 21776
301-635-6464 ext. 25

The Episcopal Church Center
Rev. Samir J. Habiby
Executive Director
Presiding Bishops Fund for W. R.
815 Second Ave.
New York, NY 10017
212-867-8400

The Episcopal Church Center
Miss Marion Morey
Assistant Director
Presiding Bishops Fund for W.R.
815 Second Ave.
212-867-8400

Goodwill Industries of America
Joseph E. Pouliott
Executive Vice President
9200 Wisconsin Ave., NW
Washington, DC 20014
301-530-6500

Lutheran Council in the U.S.A.
Rev. Richard Rhyne
Domestic Disaster Response
360 Park Ave., S
New York, New York 10010
212-532-6350 office in NYC
919-275-4636 home office

Mennonite Disaster Service
C. Nelson Hostetter
21 S. 12th St.
Akron, PA 17501
717-859-1151 or 2392

National Catholic Disaster Relief Committee
Rev. Msgr. Leo J. Coady, Chairman
Holy Redeemer Rectory
9705 Summit Ave.
Kensington, MD 20795
301-942-2333

National Conference of Catholic Charities
Brother Joseph Berg
Suite 307
1346 Connecticut Ave., NW
Washington, DC 20036
202-785-2757

Presbyterian Church in U.S.
Colleen Shannon-Thornberry
Staff Association National Services
General Assembly Mission Board
341 Ponce DeLeon Ave.
Atlanta, GA 30308
404-873-1531

The Salvation Army National Headquarters
Col. Orval A. Taylor
National Chief Secretary
120 W. 14th St.
New York, NY 10011
212-620-4900

The Salvation Army
Lt. Col. Ernest A. Miller
Director of World Service Office
1025-15th St., NW - 2nd Floor
Washington, DC 20005
202-833-5577

Seventh-Day Adventists General Conference
Perry F. Pedersen
6840 Eastern Ave.
Washington, DC 20012
202-723-0800

Seventh-Day Adventists World Service
Robert Johnson
Potomac Conference
Box 1208, Gaymont Place
Staunton, VA 24401
703-886-0771 or 737-3793

Southern Baptist Convention Home Mission Board
Dr. Paul R. Adkins, Director
Department of Christian Social Ministry
1350 Spring St., NW
Atlanta, GA 30309
404-873-4041

Southern Baptist Convention
Norman Godfrey
Director of Ministries
Brotherhood Commission

1548 Poplar Ave.
Memphis, TN 38104
901-272-2461

Society of St. Vincent De Paul
Dudley Baker
Executive Secretary
Superior Council of the U.S.
4140 Lindell Blvd.
St. Louis, MO 63108
314-371-4980

Society of St. Vincent De Paul
Col. Arthur S. Lawless
Council of the United States
715 Wilmington
Dayton, OH 45420
513-229-3159
Jan. to mid May
110 Riverside Dr.
Saranac Lake, NY 12983
518-891-4701
mid May to January

United Methodist Church Committee on Relief (UMCOR)
Paul T. Morton
Executive Secretary for Special Ministry
Board of Global Ministries
475 Riverside Dr., Room 1470
New York, NY 10027
212-678-6239 or 6290

United Presbyterian Church U.S.A.
William K. DuVal
World Relief, Emergency and Resettlement Service
475 Riverside Dr., Room 1268
New York, NY 10027

Volunteers of America
General John F. McMahon
Commander-In-Chief
340 West 85th St.
New York, NY 10024
212-873-2600

Volunteers of America
Lt. Col. Robert N. Coles
P.O. Box 398
Hagerstown, MD 21740
301-739-4431

Volunteers of America
Col. Ray C. Tremont
Southern Regional Director
433 Metairie Rd.
Metairie, LA 70005
504-837-2652

Source: *Disaster Planning Guidelines for Fire Chiefs*, IAFC/FEMA 1980, Contract DCPA 01-79-C-0303

Public Firesafety Education

Firesafety Education Programs

To prevent fires and burns through firesafety education requires more than materials like flyers, films, and posters. Materials are supportive tools used by firesafety educators in presenting a coordinated program of firesafety. Programs may be very broad in scope, embracing an entire town, or they may be narrow, for instance, confined to preschoolers or to a particular segment of the school or adult population.

Any firesafety education program must be the result of initiative and creativity at the local level. The creation of such programs, however, need not occur in the dark. There are several programs of firesafety education distributed nationwide that can be vital components of a local endeavor. In addition, there are already many local programs that can be tapped for suggestions and information.

This section contains two lists. The first describes programs of a national scope, most of them geared to educating children about firesafety. The second describes various local firesafety programs. Most of these are designed for local uses, but the sources should be consulted regarding availability of materials for other programs.

National Firesafety Education Programs

Learn Not To Burn Curriculum

Description: This is a resource workbook for teachers at three elementary school levels: K-2, 3-5, and 6-8. There is a separate edition for each of these three levels. The full-size, 3-ring binder contains much useful background information, teaching tips, and a bibliography, but the core consists of 25 curriculum cards, one for each major firesafety behavior. Each card contains objectives, activity suggestions, and means of integrating the firesafety lessons with other more traditional classroom subjects (math, art, English, social studies, etc.).

Components: Full-size, 3-ring binder containing all printed materials.

Audience: Classroom teachers of K-2, 3-5, and 6-8.

Cost: $29.50 per kit (non-member)
$26.55 per kit (member)

Source:
Public Education Department
National Fire Protection Association
Batterymarch Park
Quincy, MA 02269
(617) 328-9290

Project Burn Prevention (Complete Kit for Children)

Description: Project Burn Prevention consists of three separate units, depending upon the age of the children involved. The kit for ages 4-7 focuses on identifying home hazards, the importance of exit planning, crawling under smoke, and the possible consequences of

playing with matches. The kit for ages 7-12 focuses on scald, flame, and burn prevention. It also includes action to take in the event of a house fire and first-aid for burns. The concept and consequences of risk-taking and protecting children from burns are the focal points for the kit for ages 12-18.
Components: Each kit contains appropriate teacher's guide, posters, film, and cassettes.
Source:
Public Education Department
National Fire Protection Association
Batterymarch Park
Quincy, MA 02269
(617) 328-9290

Project Burn Prevention (Complete Kit for Adults)
Description: Stresses the significance of the burn problem in America. Discusses how to organize a community burn prevention program and provides case studies involving burn injuries to children.
Components: Leader's guide, game, investigative reports, case studies, and cassettes.
Audience: Adult.
Source:
Project Burn Prevention
Education Development Center
55 Chapel St.
Newton, MA 02160
(617) 969-7100
Source:
Public Education Department
National Fire Protection Association
Batterymarch Park
Quincy, MA 02269
(617) 328-9290

Junior Fire Marshal Program
Description: There are two editions of this program, one for children in kindergarten and grade 1, and another for students in grades 2 and 3. Centerpiece is a classroom kit entitled "Four Steps to Safety." This focuses on four firesafety behaviors: playing with matches, crawling low in smoke, using stop, drop, and roll, and home firesafety planning.
Components: Basic component is the "Four Steps to Safety" book for students. Additional components: films, filmstrips, teaching manual, coloring posters, calendars, T-shirts, helmets, etc. (available depending upon the sponsor).
Cost: $6.95 per kit ("Four Steps to Safety") plus 10% postage/handling.
Source: The Junior Fire Marshal Program is usually sponsored by a local Hartford Insurance agent. Additional information about the program may be obtained from:
Director, Fire Safety Education
Hartford Insurance Group
Hartford Plaza
Hartford, CT 06115
(203) 547-5000

Burger King Fire Safety Program
Description: Sponsored by the Burger King Corporation, there are four main parts to the program: Snuffy, the talking fire engine, for school programs, mall exhibits, and parades; a 15-minute film, "Snuffy's Fire Brigade"; an education unit; and the Hot Spot House, a four-foot high, 3-dimensional house highlighting firesafety hazards in the home.

Components: The education unit mentioned above is called "Make Time for Fire Safety." It includes large flash cards, duplicating masters, drawing and coloring projects, and a teacher's guide.

Audience: Children in grades K-6.

Cost:

$5.00 per education unit ("Make Time for Fire Safety").
$80.00 per film ("Snuffy's Fire Brigade") (Spanish version available).
$180.00 per "Hot Spot House" kit, slide, and tape show.

Source:

Robert Landau Associates Inc.
Attn: Alison Hendrie
The Chrysler Building
405 Lexington Ave.
New York, NY 10174
(212) 599-1900

The Match is a Tool

Description: A burn prevention methodology developed to assist parents with children who are playing with matches and fire.

Components: Introduction, letter to parents, "Match Is a Tool" brochure, "Control of Fireplay" flyer.

Audience: General.

Source:

Matt Maley
Shriners Burn Institute
202 Goodman St.
Cincinnati, OH 45219
(513) 751-3900

Preschool and Elementary Fire Prevention and Conservation Education Program

Source:

Lou Gunter, Educ. Officer
California Department of Forestry
416 Ninth St.
Sacramento, CA 95814
(916) 445-9920

Sesame Street Fire Safety Program

Description: Funded by the Federal Emergency Management Agency, this program combines the firesafety messages portrayed on Sesame Street through its familiar characters with face-to-face teaching and demonstrations.

Components: Fire Safety Resource Book, containing skits, songs, activities, and teaching suggestions for presenting a half dozen specific firesafety messages to preschoolers.

The Fire Safety Guidelines Book offers concrete information and advice for implementing the Sesame Street Fire Safety Project on a local level.

Audience: Preschoolers from ages 3 through 5.

Source:

Anne Marie Santoro
Fire Project Manager
Community Education Services
Children's Television Workshop
1 Lincoln Plaza
New York, NY 10023
(212) 595-3456

Local Firesafety Education Programs

The following firesafety education programs are listed in "A Guide to Fire Education Resources" published by the Office of the State Fire Marshal in California. Most of these are local programs and it is not clear that these programs are available for use outside their local regions. They are included, however, so that firesafety educators may learn what sorts of programs are being sponsored and have a contact who might provide information about a particular program, its organization, components, and success.

Fire Education Planning

Bilingual/Cultural Program

Description: Designed to develop an awareness of the various cultures found in each community and how to target your public education program to that culture.
Components: Slide/tape, specialized speaker.
Audience: In-service.
Source:
Tom Nyhan, San Francisco F. D.
260 Golden Gate Ave.
San Francisco, CA 94102
(415) 861-8000 Ext. 310

The Media - Them or Us

Description: Designed to teach effective use of the media through the development of cooperation, writing public service announcements, news releases, etc.
Components: Printed material, specialized speaker.
Audience: In-service.
Source:
Tom Nyhan, San Francisco F. D.
260 Golden Gate Ave.
San Francisco, CA 94102
(415) 861-8000 Ext. 310

Life Safety Kit: Smoke Detector Legislation

Description: A kit that contains information and material to put a smoke detector campaign together. Includes smoke detector study data, sample brochures and public service announcements.
Components: Suggested PSA, slides, printed material.
Audience: Public educators.
Source:
Federal Emergency Management Agency
P.O. Box 8181
Washington, DC 20024
(202) 287-0689

WE WANT TO KNOW . . .

if a name, an address, or a phone number has changed; if there's an upcoming event, a new program or course, a new publication being offered. If you have more current information than is contained in this *Almanac*, know something that should be included in this book, or just have something interesting about the fire protection scene that you want to contribute, please let us know. Write: Editor, *Fire Almanac*, NFPA, Batterymarch Park, Quincy, MA 02269. All suggestions will receive our careful attention.

Public Education Training

Fire Safety Survey - Residential Training

Description: This manual presents a series of lesson plans designed to teach non-fire service people to conduct firesafety surveys in homes. Manual is accompanied by 300 training slides.

Components: Slides, printed material.

Audience: General.

Source:

Jack Cooper Associates
820 Maple
Edmons, WA 98020
(206) 778-8341

Babysitter Firesafety Programs

Babysitter Safety Program

Description: Representative from the fire and police departments, ambulance personnel and a PG&E spokesman teach exit drills in the home, home security, first-aid and electrical safety.

Components: 40-slide program, specialized speaker.

Audience: Grades 6-8.

Source:

Paul J. Fieber, Merced F. D.
P. O. Box 2068
Merced, CA 95340
(209) 722-8331

Babysitter Clinic

Description: Discusses basics of babysitting using flip charts, slide/tape, and demonstrations. Subjects covered: first aid, child care, baby care, personal safety, firesafety, self values and goals for the babysitter.

Components: Film Communicators slide/tape, "The Babysitter Series: Unit I & II," props, specialized speaker.

Audience: Grades 5-12.

Source:

Birgit Davis, H. B. Fire Department
P. O. Box 180
Huntington Beach, CA 92648
(714) 536-5569

Babysitting Clinic

Description: Designed to develop student's understanding of child care, handling of emergency situations, and first aid. Babysitting Clinic is limited to 40 students.

Components: Film Communicators slide/tape, "Babysitter Series," Film Communicators, "Have a Wonderful Evening."

Audience: Grades 5-12.

Source:

Lynne Michaelis, F.V.F.D.
102000 Slatter Ave.
Fountain Valley, CA 92708
(714) 963-8321 Ext. 284

Heating Firesafety

Warm Up to Wood Safely Media Kit
Description: This kit provides instructions on installation and operation of a wood stove. Includes 4 video Public Service Announcements, 5 radio PSA scripts, brochure master, user's guide, and resource list.
Components: Printed material, audiovisual material, user's guide.
Audience: General.
Source:

Montana/Alberta Fire Inspectors Assn.
2100 16th Ave. S
Great Falls, MT 59405
(406) 761-7885

Mobile Homes

Mobile Home Safety
Description: This program discusses fire hazards in mobile homes with emphasis on smoke detectors, placement, and escape planning.
Components: Film Communicators film, "Mobile Home Fire Safety," printed material, specialized speaker.
Audience: General.
Source:

Birgit Davis, H. B. Fire Department
P. O. Box 180
Huntington Beach, CA 92648
(714) 536-5569

Multi-Level/Highrise Buildings

Hotel Motel Highrise Safety Media Kit
Description: The kit consists of 5 TV Public Service Announcements, 3 radio PSAs, 38 slides, suggested script for slides, and a user's guide.
Components: Audiovisual, printed materials.
Audience: General.
Source:

Bio Med Arts Association Inc.
350 Parnessus Ave., Suite 905
San Francisco, CA 94117
(415) 564-1000

Flammable Liquids

Carmody Hazardous Materials Trainer Kit
Description: Demonstrates properties of flammable liquids. Designed to be used for table top demonstrations on the hazards of flammable liquids.
Components: Varies with kit model ordered.
Audience: General.
Source:

Trinity Corporation
31-C Long Sands Rd.
York, ME 03909
(207) 363-2704

Table Top

Description: A table top demonstration for adults and students that teaches general firesafety and the use and misuse of flammable liquids.
Components: Learning aids, props, specialized speaker.
Audience: Grade 6 to adult.
Source:
Joe Day, L.A. Co. F.D.
P. O. Box 3009
Los Angeles, CA 90051
(213) 267-2465

Firesafety Education Resources

The success of firesafety education efforts depends on the right combination and allocation of resources available. Such resources include planning and educational materials, people, programs, and money.

This section provides tables and lists of available resources and materials on firesafety education. The first table includes firesafety catalogs that provide information on print, film, audiovisual, education materials, etc., of interest to the fire service and educators. The second table includes materials for use in firesafety education — print materials for planning and teaching, audiovisuals for planning and teaching, and print materials for working with the media. The first list includes people and organizations to contact for assistance and information on firesafety education. The second list in this section includes sources for firesafety education funding.

People and Organizations

National Fire Protection Association (NFPA) (see section about NFPA)

Contacts:
Corinne Broderick, Public Education
Batterymarch Park
Quincy, MA 02269
(617) 328-9290

Learn Not To Burn Regional Representatives

The following representatives provide assistance and information to people in their region about NFPA's Learn Not To Burn Curriculum. (NFPA contact: Caroline Mazur.)

REGION 1 (NV, CA, HI)
Jan Gratton
469 S. Albertson Ave.
Covina, CA 91723
(213) 331-8792

REGION 2 (AK, MT, ID, OR, WA)
Ron Mehlert
14116 65th Dr., W
Edmonds, WA 98020
(206) 743-1748

REGION 3 (KS, NE, OK, CO, UT, WY)
Hugh Graham
Fire Building
Oklahoma State University
Stillwater, OK 74078
(405) 624-5727

REGION 4 (TX, AZ, NM)
Carol Gross
Phoenix Fire Dept.
620 W. Washington St.
Phoenix, AZ 85003
(602) 262-6002

REGION 5 (NC, SC, GA, FL, AL, LA, AR, TN, MS)
Cathy Lohr
Fire Education Specialist and Rescue

Services Division
Dept. of Insurance
Box 26387
Raleigh, NC 27611
(919) 733-2142

REGION 6 (MI, WI, MN, SD, ND, IA)
Vacant at present

REGION 7 (KY, OH, IN, IL, MO)
Pat Mieszala
Burn Concerns
4218 N. Pulaski Rd.
Chicago, IL 60641
(312) 263-4112

REGION 8 (MD, VA, WV, PA, DE)
Edi Maletsky, Ed. Coordinator
879 Tryens Rd.
Aston, PA 19014
(215) 459-5710

REGION 9 (CT, NJ, NY)
Bill Porter
William Porter Associates
551 Litchfield Turnpike
Bethany, CT 06525
(203) 393-3706

REGION 10 (MA, RI, NH, ME, VT)
Teresa Smalley
7 Jackson Rd.
Scituate, MA 02066
(617) 545-1664

Fire Education Resource Network (FERN)

The Fire Education Resource Network was intended to serve as a resource and communications network for public firesafety educators. It was to provide support for those educators in states not involved in the U.S. Fire Administration's Public Education Assistance Program. With money from that program no longer available, FERN serves today as primarily a communications link among firesafety educators. Listed below are contact persons who provide that function and the regions they represent.

REGION 1 (ME, VT, NH, MA, RI, CT)
Gene Singer
President
4 Bennett Place
Danbury, CT 06810
(203) 744-5249

There is also a New England Fire Education Resource Network comprised of firesafety educators from the six New England states. New England FERN is a separate group with membership, meetings, and programs. The contact for New England FERN is Gene Singer.

REGION 2 (NY, NJ, PR, VI)
Harry Bohner
New York State Association of Fire Chiefs
8 Van Buren Dr.
Kinderhook, NY 12106
(518) 758-7631

REGION 3 (PA, DE, MD, DC, VA, WV)
Diane Roche
Fire Education Specialist
Virginia Beach Fire Dept.
3610 South Plaza Trail
Virginia Beach, VA 23452
(804) 486-3377

REGION 4 (NC, SC, GA, FL, AL, MS, TN, KY)
Cathy Lohr
Fire Education Specialist
Fire and Rescue Services Division
Department of Insurance
Box 26387
Raleigh, NC 27611
(919) 733-2142

REGION 5 (MN, WI, IL, IN, MI, OH)
Lonnie Jackson
Inspector
Mount Prospect Fire Dept.
112 E. Northwest Hwy.
Mount Prospect, IL 60056
(312) 392-6000

REGION 6 (NM, TX, OK, AK, LA)
Nancy Trench
Supervisor
Fire Service Training
Oklahoma State University
Stillwater, OK 74074
(405) 624-5727

REGION 7 (MD, IA, NE, KS)
W. Kent Harris
Public Fire Education Specialist
Lee's Summit Fire Dept.
207 South Douglas
Lee's Summit, MO 64063
(816) 251-2300

REGION 8 (UT, CO, WY, MT, ND, SD)
Larry Johnson
Public Information Officer
Salt Lake City Fire Dept.
159 E. 100 South
Salt Lake City, UT 84111
(801) 530-5106

REGION 9 (HI, CA, NV, AZ)
Larry Marshburn
Fire Protection Specialist
Huntington Beach Fire Dept.
2000 Main Street, Box 190
Huntington Beach, CA 92648
(714) 536-5411

REGION 10 (AL, WA, OR, ID)
Dick Small
8959 SW Barbur Blvd.
Portland, OR 97219
(503) 245-7122

Community Education Services (CES)

Through its national office in New York City and regional offices throughout the country, CES is the center of a network of community organizations, parent groups, schools, and hospitals and other institutions interested in actively employing as educational resources the productions of the Children's Television Workshop.

CES Regional Offices

Contact	**Region**
Anne Marie Santoro — Project Manager National Office Sesame Street Fire Safety Program Children's Television Workshop One Lincoln Plaza New York, NY 10023 (212) 595-3456	
Art Guidry Children's Television Workshop One Lincoln Plaza New York, NY 10023 (212) 595-3456	Mid-Atlantic: New York, New Jersey, Pennsylvania, Delaware, Washington DC, Maryland
Rob Bright Children's Television Workshop Russell St. at Fourth Ave. P.O. Drawer "X" St. Paul, VA 24283 (703) 762-9478	Appalachia: Virginia, West Virginia, No. Carolina, So. Carolina, Kentucky, Georgia, Florida, Tennessee
Daniel Ventura Children's Television Workshop 14 W. Erie St. Chicago, IL 60610 (312) 642-6703/4	Midwest: Illinois, Indiana, Michigan, Wisconsin, Ohio
Rene Pena Children's Television Workshop 1310 Anex St. - Suite 202 Dallas, TX 75204 (214) 826-5850	Southwest: Texas, New Mexico, Colorado, Oklahoma

Contact	Region
Ollye Shirley Children's Television Workshop 2775 Delta Dr. P.O. Box 11220 Jackson, MS 39213 (601) 362-5391/2	South: Mississippi, Alabama, Arkansas, Louisiana
Sandra Lindsey Children's Television Workshop 2930 West Imperial Highway Suite 310 Inglewood, CA 90303 (213) 757-0268	West Coast: California, Nevada, Arizona, Washington, Oregon, Alaska, Hawaii

Government, Commercial, and Service Organization Contacts

Children's Television Workshop

Evelyn Davis, Vice President
One Lincoln Plaza
New York, NY 10023
(212) 595-3456

Disney Educational Media Company
500 S. Buena Vista St.
Burbank, CA 91521
(213) 840-1726 (Call Collect)

Factory Mutual Engineering
1151 Boston-Providence Turnpike
Norwood, MA 02062
(617) 762-4300

Federal Emergency Management Agency
Emergency Management Training Center
National Fire Academy
Emmitsburg, MD 21727
1-800-638-9600

Federal Emergency Management Agency
Washington, DC 20472
(202) 287-0874

Fire Prevention Through Films, Inc.
P.O. Box 11
Newton, MA 02161
(617) 965-4444

Insurance Information Institute
110 William St.
New York, NY 10038
(212) 669-9200

Insurance Information Institute
400 Montgomery St.
San Francisco, CA 94104
(415) 392-3185

International Society of Fire Service Instructors
Public Educators Section
P.O. Box 88
Hopkinton, MA 01718

National Fire Protection Association
Batterymarch Park
Quincy, MA 02269
(617) 328-9290

National Institute for Burn Medicine
909 E. Ann St.
Ann Arbor, MI 48104
(313) 769-9000

National Safety Council
425 N. Michigan Ave.
Chicago, IL 60611
(312) 527-4800

Project Burn Prevention
EDC School & Society Programs
55 Chapel St.
Newton, MA 02160
(617) 969-7100

Shriners Burn Institute
202 Goodman St.
Cincinnati, OH 45219
(513) 751-3900

Underwriters Laboratories, Inc.
Public Information
333 Pfingsten Rd.
Northbrook, IL 60062
(312) 272-8800

U.S. Consumer Product Safety Commission
1111 18th St., NW
Washington, DC 20207
1-800-638-8333

U.S. Forest Service
Smokey the Bear Headquarters
Washington, DC 20252
(202) 235-8039

In addition to these specific organizations and associations, there are various positions and organizations at the state and local levels that can lend information, assistance, and support to firesafety education programs.

At the state level consult:
State Fire Marshal
State Fire Commissions
State Fire Training Schools

At the local level consult:
Fire Department, including chief, fire prevention officer, and other fire service personnel involved in education
Hospitals and burn units
Insurance agents and companies
Consumer and citizen groups, including neighborhood associations
Educators and related organizations
Utilities and banks, industrial and manufacturing concerns
Home offices of major businesses
Newspapers, radio stations, television networks, cable television stations
Boy Scout and Girl Scout troops
Religious organizations
Civic organizations (Lions, Kiwanis, Rotary, Jaycees, Civitan, etc.)
Fraternal associations (Masons, Moose, Elks, etc.)

Financial Resources

Most firesafety education funding comes from money allocated from local taxes for the fire department budget. There are, however, other sources of funding. At the local level, various fundraising activities such as carnivals, bingo, and potluck dinners have provided money for firesafety education. Fundraising drives and donations from local businesses and corporations have also been sources of money for particular projects.

In addition to these efforts at the local level, there are two major financial resources to consider: grants from the Federal Government and grants from private foundations.

The Federal Government

Categories of Assistance

Currently, the Office of Management and Budget (OMB) classifies government financial assistance through 7 types of programs. The following list from the *Catalog of Federal Domestic Assistance* defines each type.

1. **Formula Grants:** Allocations of money to States or their subdivision in accordance with a distribution formula prescribed by law or administrative regulation, for activities of a continuing nature not confined to a specific project.

2. **Project Grants:** The funding, for fixed or known periods, of specific projects or the delivery of specific services or products without liability for damages for failure to perform. Project grants include fellowships, scholarships, research grants, training grants, traineeships, experimental and demonstration grants, evaluation grants, planning grants, technical assistance grants, survey grants, construction grants, and unsolicited contractual agreements.

3. Direct Payments for Specified Use: Financial assistance from the Federal Government provided directly to individuals, private firms, and other private institutions to encourage or subsidize a particular activity by conditioning the receipt of the assistance on a particular performance by the recipient. This does not include solicited contracts for the procurement of goods and services for the Federal Government.

4. Direct Payments with Unrestricted Use: Financial assistance from the Federal Government provided directly to beneficiaries who satisfy Federal eligibility requirements with no restrictions being imposed on the recipient as to how the money is spent. Included are payments under retirement, pension and compensation programs.

5. Direct Loans: Financial assistance provided through the lending of Federal monies for a specific period of time, with a reasonable expectation of repayment. Such loans may or may not require the payment of interest.

6. Guaranteed/Insured Loans: Programs in which the Federal Government makes an arrangement to indemnify a lender against part or all of any defaults by those responsible for repayment of loans.

7. Insurance: Financial assistance provided to assure reimbursement for losses sustained under specified conditions. Coverage may be provided directly by the Federal Government or through private carriers and may or may not involve the payment of premiums.

The Grant Process

The federal grant process begins officially with the submission of an application for assistance. However, before the application is written, there are preliminary steps that must be taken. These steps are the foundation of the grant application. They should be executed thoroughly and completely.

1. Define the need. What is the problem that needs assistance through firesafety education? How specifically can the problem be defined? How specifically can the proposed assistance be defined?

Describing a problem and a proposed solution may not be as easy as it sounds. Careful consideration and work at this stage will certainly avoid problems of explaining what you "meant to say" after the application has been submitted.

The more comprehensive a project is, the more likely it will succeed in obtaining funding. Pilot projects which demonstrate novel or experimental advances or approaches that can be applied nationally also stand a good chance of receiving funding.

Before beginning the most rigorous part of proposal preparation, several phone calls or personal visits may help you determine if there is interest in funding your project by one particular government agency. Personal visits usually result in a more favorable outcome.

2. Determine the type of assistance needed. Be realistic in your proposed budget when applying for financial assistance. If you can show cost sharing, the project's chances of success increase. If strong local commitment is demonstrated, matching assistance is much more likely, regardless of the type of assistance originally requested.

Consult the list of categories of assistance to determine the kind of funding you need.

3. Locate an agency whose mission is to support and stimulate local firesafety education activities such as the one you're proposing. For a detailed listing contact a Federal Information Center local, state, or regional office, a local or regional library, or the *Catalog of Domestic Assistance.*

4. Determine your eligibility, the fire department's and/or the community's. Each program varies in eligibility requirements. Some require matching funds; others require communities to be of a certain size or composition. At this point your list of prospective federal funding sources has narrowed, and you can begin to concentrate on the proposed project.

5. Define the goals and objectives of the firesafety education program. Include a description of the purpose and the potential uses of the results of your program for other fire departments and communities. The more likely that others could replicate your project for similar benefits, the more likely your program will receive funding.

6. Obtain preliminary clearances for submitting a proposal. Often units or sub-units of governments are required by law to submit a proposal first to a state, local, or regional clearinghouse. Proposals are rated, given priorities, and receive clearances. Grants are considered as state income if received by a state agency, and grant monies must go through proper budgetary procedures as would state funds. Check for the possible need to go through a clearinghouse for approval.

7. Gather supporting information necessary for the proposal's acceptance by the agency (or agencies) that you have selected. Contact each grantor agency and establish the information items that must be proved, established, and documented to establish eligibility. Examples include nonprofit status, academic degrees, or other credentials of those who are to work or manage the program, and any licenses that may be required.

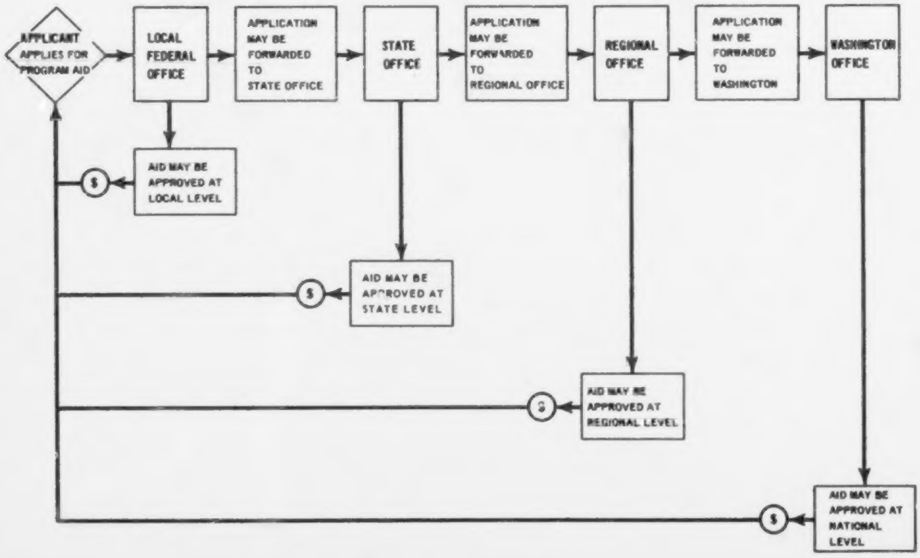
8. Check the timing of your application. It may take a clearinghouse up to 45 days to review your project, and the application procedure (from submission to award) may take one to nine months. Be patient. The federal government is complex, but for the most part, federal employees are sincere and want to help you.

9. Obtain the application forms and submit your proposal. The Federal Standard Form 424 (SF-424) is the typical document that will accompany a proposal. The SF-424 is comprised of about 12 pages of information blanks and items to be filled in by the organization applying for a grant. The SF-424 should precede the proposal and the entire packet should be submitted with a cover letter from the fire chief or city administrative official.

The grantor will review the proposal and the accompanying documentation. You will be advised if additional information is needed. At this point the federal grant process begins and you must wait patiently for notification of award or rejection. (Note: You have a legal right to a written report from a government agency rejecting your proposal.)

The following chart shows submission and approval points.

FEDERAL GRANT APPLICATION AND APPROVAL PROCESS


APPLICANT APPLIES FOR PROGRAM AID
LOCAL FEDERAL OFFICE
APPLICATION MAY BE FORWARDED TO STATE OFFICE
STATE OFFICE
APPLICATION MAY BE FORWARDED TO REGIONAL OFFICE
REGIONAL OFFICE
APPLICATION MAY BE FORWARDED TO WASHINGTON
WASHINGTON OFFICE
AID MAY BE APPROVED AT LOCAL LEVEL
$
AID MAY BE APPROVED AT STATE LEVEL
$
AID MAY BE APPROVED AT REGIONAL LEVEL
$
AID MAY BE APPROVED AT NATIONAL LEVEL
$

It should be remembered that the degree of success of a request for funds will be directly proportional to the "homework" and preparation — the foundation — that go into the proposal, as well as the magnitude of the benefits to be derived. Federal agencies receive many more proposals than they can fund. Projects in higher priority areas (as established by the agency) and judged to have the highest potential for successful results with the greatest benefit will be chosen in preference to others. Each fiscal year brings different levels of funding to each agency. It may be necessary to re-submit proposals from time to time.

The Grant Content

Proposals contain various types of information with varying levels of detail, depending upon the nature of the program. Obtain guidelines from the grantor agency to assist you in determining the content needed. Generally, the proposal should contain the following information:

1. **Background.** Include the background of the area in which your project will function. For example, if the project is to implement a home firesafety survey program, discuss briefly the residential fire problems.

If the project is for evaluating a juvenile firesetter counseling program, discuss the arson problem nationally. Consider how it affected your community to the point of implementing a counseling program.

2. **Problem or Need.** This section should contain a description of *what* needs to be done and *why* this proposed action is necessary.

3. **Benefits or Results.** Here is the part in which you list all the good things that your project will yield. Be specific in describing each benefit and be complete in the list. Don't exaggerate the benefits, either in the degree of benefit or the number of benefits. Results should relate to the community and show how it has improved or how others can implement a similar program (with or without additional government funding).

4. **Detailed Description.** In No. 2 you described *what* you were going to do. Here you describe *how*. "Detailed" is a relative term. Your project may be described in terms of who and when and where and how to the nth degree. On the other hand, the nature of the project may be to design a specific procedure for a certain firesafety education task. In this latter case your methods should be described in general terms.

As a minimum, indicate that you will submit quarterly reports to the grantor on the progress of the grant and indicate the timing on a GANTT chart (cf. No. 6, below).

5. **Budget.** In some programs the amount of money available is fixed. Your request cannot exceed the limit. In others, the proposed budget can reflect all costs and expenses necessary for the completion of the project, regardless of the amount.

Several rules, (both written and unwritten), govern the display of a project budget. Typical budget items are:

Personnel — This includes salaries and fees of those paid directly from project funds.

Fringe Benefits — Insurance, retirement, and other benefits are considered in this item. Be sure that the project funds can pay for fringe benefits. These are often considered to be part of the requesting agency's contribution to the project.

Travel — Project staff members may need to travel to other communities in a research phase of the project. Again, be realistic, not extravagant.

Equipment — Normally this item is used to cover the rental expenses of certain equipment used in the performance of the project. For example, if the project involves training, you may need to rent slide projectors, films, or a meeting room. If the project involves writing or researching a firesafety education master plan, filing cabinets, desks, and typewriters may need to be rented. Unless agreed upon by the grantor, this item cannot be used to purchase equipment.

Supplies — Generally, office supplies such as paper, ink, pens, pencils, and the like are budgeted here. Most expendable items are included. Again, check with the grantor to find out what can and cannot be included.

Contractual — This includes any work that will not be performed by your department's staff and must be paid from grant funds. This might cover instructors, data analysts, or consultants with specific expertise relating to the project.

Other — These expenses should cover items not already covered in the other categories, such as production of special materials or the use of certain facilities.

These budget items are considered to be "Direct Charges." That is, they are necessary for the direct performance of the grant.

A second category that needs consideration is "Indirect Charges." These are costs incurred by you for the administration of the grant. Such costs might include a percentage of personnel time to process checks (payroll, payments, etc.), a percentage of the costs to support the office (overhead: electricity, rent, lighting) and other similar costs. In other words, there is additional expense to administer the project and its funds. If it takes an additional 5 percent of a city accountant's time to process the grant funds, 5 percent of the accountant's salary may be charged against the grant funds.

6. Time of Performance. Indicate in the Detailed Description No. 4 at what point in time major activities occur. These times should be displayed graphically. The following GANTT chart is offered as an example.

TASKS	DESCRIPTION	MONTH									
		1	2	3	4	5	6	7	8	9	10
1	Appoint Advisory Committee		▲								
2	Gather data on fire incidents	○- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - ▲	
3	Gather data on fire inspection	○- - -	- - -	- - -	- - ▲						
4	Gather data on community development		○- - -	- - -	- - -	- - -	- - ▲				
5	Advisory Committee meetings		▲		▲		▲		▲		▲
6	Develop fire inspection plan			○- -	- ▲						
7	Develop fire inspection guidelines					○- -	- ▲				
8	Field test guidelines						○- -	- ▲			
9	Analyze test data								○- -	- ▲	
10	Submit quarterly reports			▲			▲			▲	
11	Submit final report										▲

Comments: Costs:

Approval: Title: Date:

Start ○ End ▲

Notice that the left-hand column lists major tasks associated with the program. The right-hand section shows month by month when these tasks begin and end. The months are generally indicated by 1, 2, 3... instead of their names. The numbers indicate the approximate month of the activity *after* the award date of the grant. For instance, if the grant is awarded in September and the first major activity is in October, month 1 would be October. Each date is an estimate, but that estimate should reflect a workable schedule for the staff involved.

The above are suggested items to be included in any proposal to obtain a grant of financial assistance from a federal agency. There may be additional special information required by the grantor. Extra help and information on preparing proposals are available from a variety of local or nearby sources. Once you've completed several proposals, the format and procedures will become easier and seem less complicated.

Federal Information Centers

Information on programs of interest may be obtained from a regionally-based Federal Information Center (FIC). The FIC staff can help you locate the closest and/or most appropriate federal agency that handles the program areas of interest to you. These Centers are operated by the U.S. General Services Administration.

You may contact a Center by phone, personal visit, or letter. Each Center is a focal point of information about the federal government. When you are seeking information, the Center will either provide you with the answer you need or direct you to an agency representative who can help you.

There are currently 40 cities with an FIC and an additional 43 cities connected to the nearest Center by telephone tieline. Statewide toll free 800 service is available to the residents of five states: Florida, Iowa, Kansas, Missouri, and Nebraska. The FIC addresses and telephone numbers are listed below.

Alabama
Birmingham
322-8591 Toll-free tieline to Atlanta, GA
Mobile
438-1421 Toll-free tieline to New Orleans, LA

Alaska
Federal Building and U.S. Courthouse
701 C St.
Anchorage 99513
(907) 271-3650

Arizona
Federal Building
230 N. 1st Ave.
Phoenix 85025
(602) 261-3313

Tucson
622-1522 Toll-free tieline to Phoenix

Arkansas
Little Rock
378-6177 Toll-free tieline to Memphis

California
Federal Building
300 N. Los Angeles St.
Los Angeles 90012
(213) 688-3800

Federal Building and U.S. Courthouse
650 Capitol Mall
Sacramento 95814
(916) 440-3344

Federal Building
880 Front St.
Room 1S11
San Diego 92188
(714) 293-6030

Federal Building and U.S. Courthouse
450 Golden Gate Ave.
P.O. Box 36082
San Francisco 94102
(415) 556-6600

TTY (415) 556-3323
San Jose
275-7422 Toll-free tieline to San Francisco

Santa Ana
836-2386 Toll-free tieline to Los Angeles

Colorado
Colorado Springs
471-9491 Toll-free tieline to Denver

Federal Building
1961 Stout St.
Denver 80294
(303) 837-3602

Pueblo
544-9523 Toll-free tieline to Denver

Connecticut
Hartford
527-2617 Toll-free tieline to New York City

New Haven
624-4720 Toll-free tieline to New York City

Washington, DC
7th & D Sts., SW
Room 5716
(202) 755-8660

Florida
Fort Lauderdale
522-8531 Toll-free tieline to Miami

Jacksonville
354-4756 Toll-free tieline to St. Petersburg

Federal Bldg.
51 S.W. 1st Ave.
Miami 33130
(305) 350-4155

Orlando
422-1800 Toll-free tieline to St. Petersburg

William C. Cramer
Federal Building
144 1st Ave., S
St. Petersburg 33701
(813) 893-3495

Tampa
229-7911 Toll-free tieline to St. Petersburg

West Palm Beach
833-7566 Toll-free tieline to Miami

Northern Florida
(Sarasota, Manatee, Polk, Osceola, Orange, Seminole, and Volusia counties and north)
(800) 282-8556 Toll-free line to St. Petersburg

Southern Florida
(Charlotte, De Sota, Hardee, Highlands, Okeechobee, Indian River, and Brevard Counties and south)
(800) 432-6668 Toll-free line to Miami

Georgia
Federal Building and U.S. Courthouse
75 Spring St., SW
Atlanta 30303
(404) 221-6891

Hawaii
P.O. Box 50091
Federal Building
300 Ala Moana Blvd.
Honolulu 96850
(808) 546-8620

Illinois
Everett McKinley Dirksen Bldg.
Room 250
219 S. Dearborn St.
Chicago 60604
(312) 353-4242

Indiana
Gary/Hammond
883-4110 Toll-free tieline to Indianapolis
Federal Building
575 N. Pennsylvania St.
Indianapolis 46204
(317) 269-7373

Iowa
Federal Building
210 Walnut St.
Des Moines 50309
(515) 284-4448

Other Iowa Locations:
(800) 532-1556 Toll-free to Des Moines

Kansas
Federal Building and U.S. Courthouse
444 S.E. Quincy
Topeka 66[illegible]
(913) 295-2866

Other Kansas Locations:
(800) 432-2934 Toll-free line to Topeka

Kentucky
Federal Building
600 Federal Place
Louisville 40202
(502) 582-6261

Louisiana
U.S. Custom House
423 Canal St.
Room 100
New Orleans 70130
(504) 589-6696

Maryland
Federal Building
31 Hopkins Plaza
Baltimore 21201
(301) 962-4980

Massachusetts
John F. Kennedy Federal Building
Cambridge St.
Room E-121
Boston 02203
(617) 223-7121

Michigan
McNamara Federal Building
477 Michigan Ave.
Room 103
Detroit 48226
(313) 226-7016

Grand Rapids
451-2628 Toll-free tieline to Detroit

Minnesota
Federal Building and U.S. Courthouse
110 S. 4th St.
Minneapolis 55401
(612) 349-5333

Missouri
Federal Building
601 E. 12th St.
Kansas City 64106
(816) 374-2466

Federal Building
1520 Market St.
St. Louis 63103
(314) 425-4106

Other Missouri Locations: within area code 314:
(800) 392-7711 Toll-free tieline to St. Louis

Other Missouri Locations within area codes 816 and 417:
(800) 892-5808 Toll-free tieline to Kansas City

Nebraska
U.S. Post Office and Courthouse
215 N. 17th St.
Omaha 68102
(402) 221-3353

Other Nebraska Locations:
(800) 642-8383 Toll-free line to Omaha

New Jersey
Federal Building
970 Broad St.
Newark 07102
(201) 645-3600

Paterson/Passaic
532-0717 Toll-free tieline to Newark

Trenton
396-4400 Toll-free tieline to Newark

New Mexico
Federal Building and U.S. Courthouse
500 Gold Ave., SW
Albuquerque 87102
(505) 766-3091

Santa Fe
983-7743 Toll-free tieline to Albuquerque

New York
Albany
463-4421 Toll-free tieline to New York City

Federal Building
111 W. Huron St.
Buffalo 14202
(716) 846-4010

Federal Building
26 Federal Plaza
Room 1-114
New York 10278
(212) 264-4464

Rochester
546-5075 Toll-free tieline to Buffalo

Syracuse
476-8545 Toll-free tieline to Buffalo

North Carolina
Charlotte
376-3600 Toll-free tieline to Atlanta

Ohio
Akron
375-5638 Toll-free tieline to Cleveland

Federal Building
550 Main St.
Cincinnati 45202
(513) 684-2801

Federal Building
1240 E. Ninth St.
Cleveland 44199
(216) 522-4040

Columbus
221-1014 Toll-free tieline to Cincinnati

Dayton
223-7377 Toll-free tieline to Cincinnati

Toledo
241-3223 Toll-free tieline to Cleveland

Oklahoma
U.S. Post Office and Courthouse
201 N.W. 3rd St.
Oklahoma City 73102
(405) 231-4868

Tulsa
584-4193 Toll-free tieline to Oklahoma City

Oregon
Federal Building
1220 S.W. 3rd Ave.
Room 109
Portland 97204
(503) 221-2222

Pennsylvania
Allentown/Bethlehem
821-7785 Toll-free tieline to Philadelphia

Federal Building
600 Arch St.
Philadelphia 19106
(215) 597-7042

Federal Building
1000 Liberty Ave.
Pittsburgh 15222
(412) 644-3456

Scranton
346-7081 Toll-free tieline to Philadelphia

Rhode Island
Providence
331-5565 Toll-free tieline to Boston

Tennessee
Chattanooga
265-8231 Toll-free tieline to Memphis

Clifford Davis Federal Building
167 N. Main St.
Memphis 38103
(901) 521-3285

Nashville
242-5056 Toll-free tieline to Memphis

Texas
Austin
472-5494 Toll-free tieline to Houston

Dallas
767-8585 Toll-free tieline to Fort Worth

Lanham Federal Building
819 Taylor St.
Fort Worth 76102
(817) 334-3624

Federal Building and U.S. Courthouse
515 Rusk Ave.
Houston 77002
(713) 226-5711

San Antonio
224-4471 Toll-free tieline to Houston

Utah
Ogden
399-1347 Toll-free tieline to Salt Lake City

Federal Building
125 S. State St.
Room 1205
Salt Lake City 84138
(801) 524-5353

Virginia
Newport News
(804) 244-0480 Toll-free tieline to Norfolk

Federal Building
200 Granby Mall
Room 120
Norfolk 23510
(804) 441-3101

Richmond
643-4928 Toll-free tieline to Norfolk

Roanoke
982-8591 Toll-free tieline to Norfolk

Washington
Federal Building
915 Second Ave.
Seattle 98174
(206) 442-0570

Tacoma
383-5230 Toll-free tieline to Seattle

Wisconsin
Milwaukee
271-2273 Toll-free tieline to Chicago

Catalog of Federal Domestic Assistance

A complete listing of all federal assistance programs and additional information about writing proposals can be found in the *Catalog of Federal Domestic Assistance*. The *Catalog* covers all federal funding programs. However, it takes a *knowledge* of local conditions and *imagination* to be able to select those programs which are appropriate to local conditions.

The *Catalog* is published annually, using the most current data available on the status of programs at the time the information is compiled. The basis edition of the *Catalog*, which is usually published in May, reflects completed congressional action on program legislation. A *Catalog* update is published in December and reflects completed congressional action on the President's budget proposals and on substantive legislation as of the date of the compilation. The update must be retained and used along with the basic edition in order to obtain the most current information on program revisions.

The *Catalog* is available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. The cost is $20.00 each. If you live in or near a major U.S. city, there may be a U.S. Government bookstore there which could supply a copy for the regular price. Consult the U.S. Government listings in your telephone directory.

Federal Financial Assistance for Volunteers

The federal agency action has several categories of funding programs which rely on volunteer assistance. These might be of special interest to a firesafety educator planning a large-scale program.

Mini-Grant Program — Grants to provide small amounts of money to local, public, and private nonprofit organizations for the purpose of mobilizing volunteers to work on human, social, and environmental needs, especially those related to poverty.

State Office of Voluntary Citizen Participation — Grants to states to establish or strengthen offices for volunteer services and to improve opportunities for volunteer efforts concerned with human, social, and environmental needs.

Special Volunteer Programs — Provides grants to states to establish and/or strengthen services for human, social, and environmental needs. Provides money to local organizations to mobilize volunteers to work on these needs, especially poverty. Encourages people from all walks of life and from all age groups to perform constructive volunteer service and to encourage wider volunteer participation.

Private Foundations

According to The Foundation Center (see the section on The Foundation Center which follows), a foundation is a "nongovernmental, nonprofit organization, with funds (usually from a single source, either an individual, a family, or a corporation) and program managed by its own trustees, or directors, established to maintain or aid social, educational, charitable, religious, or other activities serving the common welfare, primarily through the making of grants." (From *The Foundation Directory*, 7th edition, Marianna O. Lewis, ed., The Foundation Center, 1979, p. xii.)

According to the Center, there are some 20,000 such foundations, most of them local, and most of them giving a number of small grants for various purposes. Some of these purposes are general, while others are specific and restrictive.

One's ultimate approach to a private foundation is through a written proposal, and, as was mentioned in the section on federal grants, the preparation is the crucial phase.

One should not consider lightly the decision to approach private foundations as a source of money. This is not because foundations are cold, severe organizations trying to hold onto their funds, but because approaching foundations requires a commitment to expending a great deal of time and energy in order to maximize one's chances of success. The competition for the funds of private foundations is as severe as the competition for federal funds. Success depends on understanding the process of grantsmanship and being able to forge a solid proposal.

Volumes have been written on how to use private foundations for funding programs. Since it would be impossible to capsulize all that has been written, it is more practical to list and describe some of the major reference works and resources available. There are no foundations devoted exclusively to providing funds for fire protection or firesafety education. However, since fire does not seem to be a normal category for consideration, a great many foundations do provide funds for education and community development, as well as for social health and welfare. Private foundations stand as a solid finanacial resource for a firesafety education coordinator to consider.

The Foundation Center

In 1956, the Foundation Center was incorporated by the Board of Regents of the University of the State of New York as an educational institution. Through research, publication and libraries, the Center gathers and distributes information nationally on charitable foundations for public use. If you are considering private foundations as a funding source or if you have already decided to tap them for grants, The Foundation Center publications will give you background information and advice.

The Foundation Directory

Published by the Foundation Center, this standard reference directory contains the most up-to-date information available about nongovernmental, grant-making foundations in the U.S. Approximately 3,000 foundations (qualified by definition and size of assets or aggregrate annual giving) are included. Most entries are based on recent fiscal reports. The most current directory available is the 8th edition. Most libraries have a copy of *The Foundation Directory* in their collection of reference books.

The Foundation Grants Index

Published yearly by The Foundation Center, this book contains descriptions of recently awarded grants that reflect interests of the reporting foundations.

Other Services and Publications of The Foundation Center

Other services and publications of The Foundation Center are listed in the introduction to *The Foundation Directory*. Publications are available at the libraries listed below; also check your local library.

Several other publications are:
About Foundations: How to Find the Facts You Need to Get a Grant
by Carol M. Kurzig
What Makes a Good Proposal?
by F. Lee Jacquette and Barbara L. Jacquette
What Will a Foundation Look for When You Submit a Grant Proposal?
by Robert A. Mayer

Reference Collections Operated by The Foundation Center

The Foundation Center
888 Seventh Ave.
New York, NY 10019
(212) 975-1120

The Foundation Center
Kent H. Smith Library
739 National City Bank Building
Cleveland, OH 44114
(216) 861-1933
(Covers Illinois, Indiana, Kentucky, Michigan, Missouri, Ohio, Pennsylvania, and Wisconsin)

The Foundation Center
1001 Connecticut Ave., NW
Washington, DC 20036
(202) 331-1400

The Foundation Center
312 Sutter St.
San Francisco, CA 94108
(415) 397-0902
(Covers Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming)

Cooperating Collections with Foundation Center Materials

Alabama

Birmingham Public Library
2020 Park Place
Birmingham 35203
(205) 254-2541

Auburn University at Montgomery Library
Montgomery 36117
(205) 279-9110

Alaska

University of Alaska, Anchorage Library
3211 Providence Dr.
Anchorage 99504
(907) 263-1848

Arizona

Tucson Public Library
Main Library
200 S. Sixth Ave.
Tucson 85701
(602) 791-4393

Arkansas

Westark Community College Library
Grand Ave. at Waldron Rd.
Fort Smith 72913
(501) 785-4241

Little Rock Public Library
Reference Dept.

700 Louisiana St.
Little Rock 72201
(501) 374-7546

California
Edward L. Doheny Memorial Library
University of Southern California
Los Angeles 90007
(213) 741-2540

San Diego Public Library
820 E St.
San Diego 92101
(714) 236-5816

Colorado
Denver Public Library
Sociology Division
1357 Broadway
Denver 80203
(303) 573-5152

Connecticut
Hartford Public Library
Reference Dept.
500 Main St.
Hartford 06103
(203) 525-9121

Delaware
Hugh Morris Library
University of Delaware
Newark 19711
(302) 738-2965

Florida
Jacksonville Public Library
Business, Science, and Industry Department
122 N. Ocean St.
Jacksonville 32202
(904) 633-3926

Miami-Dade Public Library
Florida Collection
One Biscayne Blvd.
Miami 33132
(305) 579-5001

Georgia
Atlanta Public Library
10 Pryor St., SW
Atlanta 30303
(404) 688-4636
(Also covers Alabama, Florida, South Carolina, and Tennessee)

Hawaii
Thomas Hale Hamilton Library
University of Hawaii
Humanities and Social Sciences Division
2550 The Mall
Honolulu 96822
(808) 948-8568

Idaho
Caldwell Public Library
1010 Dearborn St.
Caldwell 83605
(208) 459-3242

Illinois
Donors Forum of Chicago
208 LaSalle St.
Chicago 60604
(312) 726-4882
(Also covers Indiana, Michigan, Minnesota, Missouri, Ohio, and Wisconsin)

Sangamon State University Library
Shepherd Rd.
Springfield 62708
(217) 786-6633

Indiana
Indianapolis-Marion County Public Library
40 St. Clair St.
Indianapolis 46204
(317) 635-5662

Iowa
Public Library of Des Moines
100 Locust St.
Des Moines 50309
(515) 283-4259

Kansas
Topeka Public Library
Adult Services Dept.
1515 Tenth St.
Topeka 66604
(913) 233-2040

Kentucky
Louisville Free Public Library
Fourth and York Sts.
Louisville 40203
(502) 584-4154

Louisiana
New Orleans Public Library
Business and Science Division
219 Loyola Ave.
New Orleans 70140
(504) 586-4919

Maine

University of Southern Maine Center for Research and Advanced Study
246 Deering Ave.
Portland 04102
(207) 780-4411

Maryland

Enoch Pratt Free Library
Social Science and History Dept.
400 Cathedral St.
Baltimore 21201
(301) 396-5320

Massachusetts

Associated Foundation of Greater Boston
294 Washington St., Suite 501
Boston 02108
(617) 426-2608

Boston Public Library
Copley Square
Boston 02117
(617) 536-5400

Michigan

Henry Ford Centennial Library
15301 Michigan Ave.
Dearborn 48126
(313) 271-1000

Purdy Library
Wayne State University
Detroit 48202
(313) 577-4040

Michigan State University Libraries
Reference Library
East Lansing 48824
(517) 353-8816

University of Michigan - Flint
UM - F Library
Reference Dept.
Flint 48503
(313) 762-3408

Grand Rapids Public Library
Sociology and Education Dept.
Library Plaza
Grand Rapids 49502
(616) 456-4411

Minnesota

Minneapolis Public Library
Sociology Dept.
300 Nicollet Mall
Minneapolis 55401
(612) 372-6555
(Also covers North Dakota and South Dakota)

Mississippi

Jackson Metropolitan Library
301 State St.
Jackson 39201
(601) 352-3677

Missouri

Clearinghouse for Midcontinent Foundations
University of Missouri, Kansas City
School of Education Building
52nd St. and Holmes
Kansas City 64110
(816) 276-1176
(Also covers Kansas)

Kansas City Public Library
311 E. 12th St.
Kansas City 64106
(816) 221-2685
(Also covers Kansas)

The Danforth Foundation Library
222 S. Central Ave.
St. Louis 63105
(314) 862-6200

Springfield - Greene County Library
397 E. Central St.
Springfield 65801
(417) 869-4621

Montana

Eastern Montana College Library
Reference Dept.
Billings 59101
(406) 657-2320

Nebraska

W. Dale Clark Library
Social Sciences Dept.
215 S. 15th St.
Omaha 68102
(402) 444-4822

Nevada

Clark County Library
1401 E. Flamingo Rd.
Las Vegas 89109
(702) 733-7810

Washoe County Library
301 S. Center St.
Reno 89505
(702) 785-4190

New Hampshire
The New Hampshire Charitable Fund
One South St.
P.O. Box 1335
Concord 03301
(603) 225-6641

New Jersey
New Jersey State Library
Governmental Reference
185 W. State St.
P.O. Box 1898
Trenton 08625
(609) 292-6220

New Mexico
New Mexico State Library
300 Don Gaspar St.
Santa Fe 87501
(505) 827-2033

New York
New York State Library
Cultural Education Center
Humanities Section, 6th Floor
Empire State Plaza
Albany 12230
(518) 474-7645

Buffalo and Erie County Public Library
Lafayette Square
Buffalo 14203
(716) 856-7525

Levittown Public Library
Reference Dept.
One Bluegrass Lane
Levittown 11756
(516) 731-5728

Plattsburgh Public Library
Reference Dept.
15 Oak St.
Plattsburgh 12901
(518) 563-0921

Rochester Public Library
Business and Social Sciences Division
115 South Ave.
Rochester 14604
(716) 428-7328

Onondaga County Public Library
335 Montgomery St.
Syracuse 13202
(315) 473-4491

North Carolina
North Carolina State Library
109 E. Jones St.
Raleigh 27611
(919) 733-3270

The Winston-Salem Foundation
229 First Union National Bank Building
Winston-Salem 27101
(919) 725-2382

North Dakota
The Library
North Dakota State University
Fargo 58105
(701) 237-8876

Ohio
The Public Library of Cincinnati and Hamilton County
Education Dept.
800 Vine St.
Cincinnati 45202
(513) 369-6940
(Also covers Indiana and Kentucky)

Oklahoma
Oklahoma City Community Foundation
1300 N. Broadway
Oklahoma City 73103
(405) 235-5621

Tulsa City-County Library System
400 Civic Center
Tulsa 74103
(918) 581-5144

Oregon
Library Association of Portland
Education and Documents Room
801 SW Tenth Ave.
Portland 97205
(503) 223-7201

Pennsylvania
The Free Library of Philadelphia
Logan Square
Philadelphia 19103
(215) 686-5423
(Also covers Delaware)

Hillman Library
University of Pittsburgh
Pittsburgh 15260
(412) 624-4528

Rhode Island
Providence Public Library
Reference Dept.
150 Empire St.
Providence 02903
(401) 521-7722

South Carolina
South Carolina State Library
Reader Services Dept.
1500 Senate St.
Columbia 29211
(803) 758-3181

South Dakota
South Dakota State Library
State Library Building
322 Fort St.
Pierre 57501
(605) 773-3131

Tennessee
Memphis Public Library
1850 Peabody Ave.
Memphis 38104
(901) 528-2957

Texas
The Hogg Foundation for Mental Health
The University of Texas
Austin 78712
(512) 471-5041

Dallas Public Library
History and Social Sciences Division
1954 Commerce St.
Dallas 75201
(214) 748-9071

El Paso Community Foundation
El Paso National Bank Building,
Suite 1616
El Paso 79901
(915) 533-4020

Funding Information Library
Minnie Stevens Piper Foundation
201 N. St. Mary's St., Suite 100
San Antonio 78205
(512) 277-8119

Utah
Salt Lake City Public Library
Information and Adult Services
209 E. Fifth St.
Salt Lake City 84111
(801) 363-5733
(Also covers Idaho, Nevada, and Wyoming)

Vermont
State of Vermont Department of Libraries
Reference Services Unit
111 State St.
Montpelier 05602
(802) 828-3261

Virginia
Richmond Public Library
Business, Science, and Technology Dept.
101 E. Franklin St.
Richmond 23219
(804) 780-8223

Washington
Seattle Public Library
1000 Fourth Ave.
Seattle 98104
(206) 625-4881

Spokane Public Library
Reference Dept.
West 906 Main Ave.
Spokane 99201
(509) 838-3361

West Virginia
Kanawha County Public Library
123 Capitol St.
Charleston 25301
(304) 343-4646

Wisconsin
Marquette University Memorial Library
1415 W. Wisconsin Ave.
Milwaukee 53233
(414) 224-1515
(Also covers Illinois, Michigan,
and Minnesota)

Wyoming
Laramie County Community College
Library
1400 E. College Dr.
Cheyenne 82001
(307) 634-5853

Puerto Rico
Consumer Education and Service Center
Department of Consumer Affairs
Minillas Central Government Building
North
Santurce 00908

Mexico
Biblioteca Benjamin Franklin
Londres 16
Mexico City 6, D.F.

Public Management Institute

Located in San Francisco, the Public Management Institute publishes two major works dealing with fundraising strategies. These are:

The New Grants Planner: A Systems Approach to Grantsmanship
by Daniel Lynn Conrad and the Research and Development Staff
of the Public Management Institute

This is a comprehensive, methodical guide for the person and/or organization that wishes to pursue private and public sources of grants. Included is a systems approach to preparation and submitting of grants, forms and worksheets, vital grants data, and a bibliography. It is bound in a large, 3-ring binder. Cost is $47.50.

Successful Fundraising Techniques

This second PMI publication covers a variety of fundraising techniques, including direct mail, solicitation of major gifts, grants from public and private sources, and other means. This is a full-size book for the person and/or organization that wishes to secure funds through a variety of fundraising techniques in addition to or in place of grants. Cost of this volume is $37.50.

Both of these books are available from:

Public Management Institute
358 Brannen St.
San Francisco, CA 94107
(415) 896-1900

Annual Register of Grant Support, 1981-1982, 15th edition

Published by Marquis Academic Media, this reference work gives valuable information about public and private grants. Primary divisions of information are by category of interest, e.g., Special Populations, Urban and Regional Affairs, Education, and so on. Within each division grant sources (public and private) are listed alphabetically. The information given about each source generally includes the year founded, names of programs, types of grants, year program started, purpose, eligibility, financial data, number of awards per year, application information, officers, and address for inquiries.

Check your local library or a local college library.

Publisher's Address:

Marquis Academic Media
Marquis Who's Who, Inc.
200 E. Ohio St.
Chicago, IL 60611
(312) 787-2008

FIRESAFETY EDUCATION CATALOGS

Source	Catalog Title	Description	Audience
Office of the State Fire Marshal (Hugh Council) 7171 Bowling Drive Suite 600 Sacramento, CA 95823 (916) 427-4166	Fire Education Resources	thorough summary of materials (print, film, slides), people and programs; well organized; updated periodically	fire prevention officers and firesafety educators
National Fire Protection Association (NFPA) Publications Department Batterymarch Park Quincy, MA 02269 (617) 328-9290	Firesafety Educational Materials	education materials; posters, flyers, firesafety programs, films, books pictured and described	
	Firesafety Films and Audiovisuals	contains brief descriptions of NFPA films and slide-tapes; sections on community awareness and firesafety for children and general public included	
	Fire Prevention Week Catalog	spotlight of NFPA's materials relevant to Fire Prevention Week; theme for year; published yearly	fire prevention officers and firesafety educators
	Health Care Catalog	description of firesafety training and educational materials for use in health care facilities	fire prevention officers, firesafety and educators, health care training personnel
	Business and Industry	description of firesafety materials for use in business and industry	fire prevention officers, firesafety educators and personnel in business environments
Shriners Burn Institute (Matt Maley) 202 Goodman St. Cincinnati, OH 45219 (513) 751-3900	Print Materials List	list of available pamphlets related to fire, prevention and burns	firesafety educators and fire prevention officers
	Resource Materials List	list of films and other materials available on a loan basis	

Federal Emergency Management Agency (FEMA) P.O. Box 8181 Washington, DC 20024 (202) 287-0689	FEMA #20	publications of the Federal Emergency Management Agency; includes materials on fire, arson, and firesafety education	fire prevention officers and firesafety educators
National Safety Council P.O. Box 11933 Chicago, IL 60611 (312) 527-4800 1-800-621-8051 (TOLL FREE "Hot Line" for ordering. Not usable in IL.)	General Materials Catalog	print, film, and audiovisual materials from the National Safety Council; one page focus on industrial firesafety	fire prevention officers, firesafety educators, and safety personnel working in industrial settings
Channing L. Bete Co., Inc. 200 State Rd. Deerfield, MA 01373	Catalog of Scriptographic Booklets	illustrated booklets on public safety topics; section on firesafety included	fire prevention officers, firesafety educators, teachers

FIRESAFETY EDUCATION MATERIALS

Source	Title	Description
		Print materials for planning
National Fire Protection Association (NFPA) Batterymarch Park Quincy, MA 02269 (617) 328-9290	Fire Protection Handbook	15th ed., Sec. 1, Introduction to Fire Protection and Fire Prevention
	Firesafety Educator's Handbook	manual of strategies and ideas for firesafety educators, teachers, community leaders, and others responsible for planning fire prevention and protection
Federal Emergency Management Agency (FEMA) P.O. Box 8181 Washington, DC 20024 (202) 287-0689	Master Planning: Report To Congress	
	Fire and Emergency Master Planning — A Selected Bibliography	
	Multi-Jurisdictional Fire Protection Planning	
	Public Fire Education Planning Process — A Five Step Process	
	Fire Education Planning	
	Teaching Fire Safety Education	
International Fire Service Training Association (IFSTA) Customer Services — Fire Protection Publications Oklahoma State University Stillwater, OK 74074 (405) 624-5723	Public Fire Education IFSTA 606	manual for designing and implementing firesafety education programs
Consumer Product Safety Commission (CPSC) 5401 Westbard Ave. Bethesda, MD 20207 (301) 492-6800	Strategy Manual	manual for conducting fire prevention and safety education programs for low-income minorities

		Audiovisual materials for planning
NFPA	Reaching the Public: Unit 1 The Fire Service Role Reaching the Public: Unit 2 Techniques and Strategies	each unit consists of an 80-slide/tape program for in-service training of fire safety educators
IFSTA	Public Fire Education Specialist	77-slide/tape program explains some community fire protection and education problems and offers strategies as solutions
		Print materials for teaching
Shriners Burn Institute (Matt Maley) 202 Goodman St. Cincinnati, OH 45219 (513) 751-3900	Firesafety Education Within the Content of the Curriculum	focus on integrating firesafety information with specific classroom subjects
	The Fire and Burn Problem	paper on importance of public education as a tool for reducing fire-related death and injury
Children's Television Workshop (Anne Marie Santoro, Fire Project Manager, Community Education Services) 1 Lincoln Plaza New York, NY 10023 (212) 595-3456	Firesafety Resource Book	from the Sesame Street Firesafety Project; focus on six firesafety areas; offers solid advice on reaching preschoolers; skits and teaching activites included
FEMA	Young Children — A New Target for Public Education	
	Teaching Firesafety Through Exhibits	exhibits to build, skits, activities to do
	Firesafety on Television for Preschoolers — Fire Education for Sesame Street	highlights use of television for teaching fire education to preschool children
	Interviewing and Counseling Juvenile Firesetters: The Child Under 7 Years of Age	
	Urban Fire Education: Seattle Case Study	
NFPA	Firesafety Educator's Handbook	teaching strategies and techniques to reach a wide variety of audiences

FIRESAFETY EDUCATION MATERIALS

Source	Title	Description
IFSTA	Public Fire Education IFSTA 606	manual containing suggestions for reaching different audiences with different types of programs
		Audiovisual materials for teaching
NFPA	Stop School Fires	slide/tape program examines major causes of school fires and offers fire prevention measures against them
Fire Marshal's Association (Mary Nachbar) 14550 Minnetonka Blvd. Minnetonka, MN 55343 (612) 933-2511	It's Only A Drill	slide/tape presentation for teachers and students that destroys false notion that fire drills are unnecessary exercises
		Print materials for working with media
FEMA	Media Idea Workbook	
	Cable Television for the Fire Service	
	Media is the Message — Cooking Fire Prevention Media Workbook	
	Media Guidebook for "America's Burning! Stop Arson!"	
	Fire Education and the News	
NFPA	Firesafety Educators Handbook	manual of firesafety education stategies; section on use of media included
IFSTA	Public Fire Education IFSTA 606	firesafety education manual contains section on making effective use on making effective use of newspaper, television, radio in a firesafety campaign

State Listing of Firesafety Education Mandates

States Where Firesafety Education Is Mandatory In the Classroom

Arkansas (not less than 20 minutes each scholastic week)
District of Columbia
Indiana
Massachusetts
New Jersey (not less than 30 minutes per week)
New York (not less than 45 minutes per school month)
North Carolina
Oregon
Pennsylvania
Rhode Island
Virginia
West Virginia

States Where Firesafety Education Is Prescribed by the Department of Education/Education Code

California
Ohio
Texas

States Where Firesafety Education Is Not Legislated to be Taught in the Schools

Although the states listed below do not have legislative mandates prescribing that firesafety lessons be taught in the classroom, many of them do have voluntary support from fire marshals, fire department personnel, and educators to teach firesafety in community schools.

Alabama
Alaska
Arizona
Colorado
Connecticut
Delaware
Florida
Georgia
Hawaii
Idaho
Illinois
Iowa
Kansas
Kentucky
Louisiana
Maine
Maryland
Michigan
Minnesota
Mississippi
Missouri
Montana
Nebraska
Nevada
New Hampshire
New Mexico
North Dakota
Oklahoma
South Carolina
South Dakota
Tennessee
Utah
Vermont
Washington
Wisconsin
Wyoming

Firesafety Education Calendar of Events/1983

January

National Firesafety Education Conference
Washington, DC area
January 13-16
Contact:
Mary McCormack, ISFSI, (617) 881-5800

February

Public Fire Education Class
Arkansas Fire Academy
February 12-13
Contact:
Mary Steelman, Arkansas Fire Academy, (501) 574-1521

Florida Chapter of International Association of Arson Investigators
Training Conference
Tampa, FL
February 28-March 4
Contact:
Joe Molnar
Clearwater Fire Dept.
610 Franklin St.
Clearwater, FL 33516

March

Florida Department Instructors Conference
Memphis, TN
March 13-17
Contact:
Mary McCormack, ISFSI, (617) 881-5800

April

Public Fire Education Conference
State of Missouri
Early April (tentative)
Contact:
Dennis Jones
Metro Fire Marshals Association, (314) 353-7676

Advanced Public Educators School
Portland, OR
April 11-15
Contact:
Jim Washburn (503) 649-8577

May

South Florida Firesafety Association
Annual Fire Prevention Seminar
Florida International University
Miami, FL
May 2-6
Contact:
Robin Gutman
Fire Marshal
3401 Hollywood Blvd.
Hollywood, FL 33201

State of Alaska Public Education Conference
Anchorage, AK
Week of May 8
Contact:
Division of Fire Prevention,
(907) 272-2406

National Fire Protection Association Annual Meeting
Education Section Meeting
Kansas City, MO
May 16-19
Contact:
NFPA Meetings Dept., (617) 328-9290

Public Fire Education Class
Arkansas Fire Academy
May 21-22
Contact:
Mary Steelman, Arkansas Fire Academy, (501) 574-1521

June

New York State Public Education Conference
June 3-5 (tentative)
Contact:
New York State Office of Fire Prevention and Control
(518) 474-6746

July

Florida Fire Chiefs Association
Annual Conference
Boca Raton, FL
July 17-21

Contact:
Chief Bob Richardson
Panama City Fire Dept.
Panama City, FL 32401

August
National Learn Not To Burn Conference
NFPA Headquarters, Quincy, MA
August 14-18
Contact:
NFPA Public Education Dept.
(617) 328-9290

Public Fire Education Officer II Class
Arkansas Fire Academy
August 22-25
Contact:
Mary Steelman, Arkansas Fire Academy, (501) 574-1521

September
None Scheduled

October
Florida Fire Marshals Association
34th Annual Fire Prevention Symposium
*Tampa Bay Area
October 25-28
Contact:
Buddy Dewar, Director
Division of State Fire Marshal
Larson Building #458
Tallahassee, FL 32304
*Tentative

International Society of Fire Service Instructors Fall Meeting
Firesafety Educators Section
Harrisburg, PA
October 26-30
Contact:
Mary McCormack, ISFSI, (617) 881-5800

November
National Fire Protection Association Fall Meeting
Education Section meeting
Orlando, FL
November 14-16
Contact:
NFPA Meetings Dept., (617) 328-9290

December
None Scheduled

Note: If you would like your firesafety events listed in the *1984 Fire Almanac*, send the name, date, and place of the event; the name of the sponsoring organization; and the name, address, and telephone number of the person to contact for more information to: Editor, *Fire Almanac*, NFPA, Batterymarch Park, Quincy, MA 02269.

Fire Protection in Business and Industry

Large-Loss Fires

Historically, large-loss fires are few in number, but account for a disproportionate amount of the direct fire loss each year. For 1981, the most recent year for which statistics are available, the NFPA estimated that 2.9 million fires of varying severity were attended by the public fire service and $6.7 billion in total property loss resulted from these fires.[1] The large-loss fires reported for 1981 accounted for only .01 percent of the total fires, but the direct dollar loss attributed to these fires accounted for 12.4 percent of the overall property loss.

In addition to the direct losses that result from large-loss fires, substantial indirect losses may result, particularly to businesses and the community in which they are located.[2] A large enterprise may experience a devastating fire and a loss of income from disruption of the normal flow of business. Customers may be forced to go elsewhere and not return if normal business is resumed. As a result, smaller businesses in the community may suffer, especially if their flow of everyday business depended heavily on that single industry. Ultimately, the whole community suffers and may experience a loss of a labor market and tax revenues, as well as incur the burden of paying welfare and other benefits to the unemployed.

Business properties experience the most large-loss fires; however, in recent years there has been an increase in the number of school and church fires reported as large losses. These fires impact the community due to the cost of replacing depreciated buildings and equipment with new facilities and the cost of finding temporary quarters until construction of a new school or church can be completed.

A significant reduction in the dollar loss from fire in the United States can be achieved by correcting the deficiencies that allow large-loss fires to develop. It has been the primary purpose of the "Large-Loss Fire Study" published annually in NFPA's *Fire Journal®*, to report these deficiencies through statistical analyses and detailed reporting of selected fire incidents.

Both the public and private sectors of the community have the responsibility to safeguard property from fire. Building codes, fire prevention codes, and public fire protection are functions of government. Through inspection and enforcement of codes and ordinances, local governments can reduce the threat of a large-loss fire impacting their community. The business community has the responsibility for implementing and adhering to firesafety codes and practices pertinent to their industry. For instance, acceptance of industry-wide firesafety standards can reduce the likelihood of a devastating factory or warehouse fire. An in-place firesafety program that safeguards against arson, a preventive maintenance schedule for equipment, good product storage and housekeeping practices, and inspection of private fire protection systems to ensure operation can all help prevent a potential large-loss fire.

FIRE LOSSES OF $10 MILLION OR MORE IN THE UNITED STATES, 1977-1981

Date	Location	Property Use	Estimated Loss
Feb. 5, 1977	Homewood, IL	Racetrack Grandstand	$15,000,000
Apr. 14, 1977	Cherry Hill, NJ	Grandstand-Clubhouse	12,055,000
July 7, 1977	Farmington, NM	Electric Generating Plant	24,000,000
July 8, 1977	Fairbanks, AK	Oil Pipeline Pump Station	40,000,000
Aug. 1, 1977	Los Padres National Forest, CA	Brush (178,000 acres)	17,428,000
Oct. 28, 1977	Dallas, TX	Electric Generating Plant	15,000,000
Dec. 22, 1977	Westwego, LA	Grain Elevator	30,000,000
Dec. 27, 1977	Galveston, TX	Grain Elevator	25,000,000
Jan. 31, 1978	Grand Blanc, MI	Auto Parts Warehouse	10,000,000
Mar. 1, 1978	Los Angeles, CA	DC-10 Aircraft	30,000,000
May 30, 1978	Texas City, TX	Oil Refinery	32,427,300
Sept. 21, 1978	Bensenville, IL	General Warehouse	25,000,000
Oct. 3, 1978	Commerce City, CO	Oil Refinery	20,000,000
Oct. 23, 1978	Los Angeles, CA	Brush and homes	35,106,000
Nov. 5, 1978	Des Moines, IA	Department Store	25,000,000
Nov. 19, 1978	Stickney, IL	Racetrack Grandstand-Clubhouse	10,000,000
Dec. 26, 1978	West Palm Beach, FL	Jai Alai Fronton	12,000,000
Jan. 6, 1979	San Antonio, TX	Municipal Auditorium	12,000,000
Jan. 16, 1979	London, KY	Mercantile Block	10,000,000
Jan. 17, 1979	Edison, NJ	General Warehouse	30,000,000
Mar. 20, 1979	Linden, NJ	Oil Refinery	14,300,000
Apr. 19, 1979	Port Neches, TX	Tank Ship	32,000,000
June 14, 1979	New York, NY	Department Store	10,000,000
July 31, 1979	Houston, TX	Apartment Complex	20,000,000
Aug. 30, 1979	LaPlace, LA	Tank Barge	10,500,000
Sept. 1, 1979	Deer Park, TX	Tank Ship	77,000,000
Jan. 20, 1980	Borger, TX	Oil Refinery	50,000,000
Feb. 13, 1980	Totowa, NJ	Paper Products Warehouse	10,000,000
Feb. 19, 1980	Huntsville, AL	Multi-Use Industrial Park	26,000,000
Feb. 19, 1980	Spearfish, SD	Lumber Mill	10,000,000
May 13, 1980	Los Angeles, CA	Aircraft Parts Warehouse	10,572,500
June 10, 1980	Newark, DE	Automobile Assembly Plant	13,000,000
June 13, 1980	Covington, VA	Synthetic Fiber Manufacturing	10,152,500
June 23, 1980	New York, NY	Office Building	15,000,000
July 7, 1980	Perth Amboy, NJ	Multi-Use Industrial Park	12,000,000
July 8, 1980	New Orleans, LA	Plumbing Supply Manufacturer	35,250,000
July 29, 1980	Salem, NH	Racetrack Clubhouse	20,000,000
Oct. 14, 1980	Pekin, IL	Electric Power Plant	17,000,000
Oct. 21, 1980	New Castle, DE	Chemical Manufacturer	45,000,000
Nov. 21, 1980	Las Vegas, NV	Hotel	50,000,000
Nov. 24, 1980	San Bernadino, CA	Brush and Homes	38,031,400
Jan. 16, 1981	Fort Worth, TX	Country Club	10,000,000
Feb. 10, 1981	Las Vegas, NV	Hotel	12,900,000
Feb. 14, 1981	Louisville, KY	Sewage System	40,000,000
Mar. 11, 1981	Los Angeles, CA	Electric Equipment Manufacturer	11,075,000
Mar. 18, 1981	Alden, NY	Gasket Manufacturer	13,000,000
Mar. 19, 1981	Kernersville, NC	Textile Plant	14,000,000
Mar. 30, 1981	Tacoma, WA	Department Store	12,000,000
Apr. 7, 1981	Corpus Christi, TX	Grain Elevator	23,000,000
June 22, 1981	Saint Helena, CA	Brush and Homes	35,666,500
Aug. 4, 1981	Bakersfield, CA	TA-7 Navy Aircraft	10,000,000
Oct. 12, 1981	Lynchburg, VA	Furniture Manufacturer	15,000,000
Nov. 28, 1981	Lynn, MA	Lynn Conflagration	70,000,000
Dec. 13, 1981	Greenville, SC	Shopping Mall	30,000,000

The dollar losses in this table may differ from previously published tables since only verified losses of $10 million or more are included and dollar amounts have been updated with new information.

It is recognized that since some fires suspected of causing a loss of $10 million or more could not be verified by a source considered reliable, the listing is not complete.

NOTEWORTHY FIRES IN THE UNITED STATES PRIOR TO 1977 WITH LOSSES OVER $25 MILLION

Date	Location	Property Use	Estimated Loss
Dec. 16, 1835	New York, NY	Conflagration — 674 buildings	$ 26,000,000
Oct. 8, 1871	Chicago, IL	The Great Chicago Fire — 17,430 buildings (250 killed)	168,000,000
Nov. 9, 1872	Boston, MA	The Great Boston Fire — 776 buildings (13 killed)	75,000,000
Feb. 7, 1904	Baltimore, MD	Conflagration — 80 business blocks	50,000,000
Apr. 18, 1906	San Francisco, CA	Earthquake - Conflagration — 28,000 buildings (452 killed)	350,000,000
Oct. 12, 1918	Minnesota	Forest Fires — 4,000 homes (559 killed)	35,000,000
Feb. 9, 1942	New York, NY	S.S. Normandie Ocean Liner	53,000,000
Sept. 15, 1945	Near Miami, FL	Aircraft Hanger	30,000,000
Apr. 16, 1947	Texas City, TX	Cargo Ships and Waterfront Industrial Area (468 killed)	67,000,000
Oct. 23, 1947	Maine	Forest Fires — Over 1,200 homes and other buildings (16 killed)	30,000,000
Aug. 12, 1953	Livonia, MI	Automobile Transmission Plant (6 killed)	32,000,000
Dec. 19, 1960	Brooklyn, NY	U.S.S. Constellation Aircraft Carrier	47,942,000
Nov. 6, 1961	Los Angeles, CA	505 buildings destroyed, 32 others damaged	30,000,000
Jan. 16, 1967	Chicago, IL	McCormack Place Exhibition Hall	52,500,000
Jan. 27, 1967	Cape Kennedy, FL	Apollo Spacecraft Cabin Fire (3 killed)	75,000,000
May 11, 1969	Golden, CO	Nuclear Weapons Plant	45,000,000
Oct. 17, 1970	Marietta, GA	Military C5A Aircraft	30,000,000
Dec. 5, 1970	Linden, NJ	Oil Refinery	50,000,000
May 27, 1973	Chicago, IL	Warehouse Complex	37,000,000
Feb. 27, 1975	New York, NY	Telephone Exchange	60,000,000

WE WANT TO KNOW . . .

if a name, an address, or a phone number has changed; if there's an upcoming event, a new program or course, a new publication being offered. If you have more current information than is contained in this *Almanac*, know something that should be included in this book, or just have something interesting about the fire protection scene that you want to contribute, please let us know. Write: Editor, *Fire Almanac*, NFPA, Batterymarch Park, Quincy, MA 02269. All suggestions will receive our careful attention.

WHAT'S A LARGE-LOSS FIRE?

In 1931, NFPA's Department of Records used the term "large-loss fire" to introduce the Annual Conflagration Map which spotted U.S. fires for 1930 that resulted in $250,000 or more in property damage. This map complemented the yearly statistics on U.S. fire losses traditionally compiled by the National Board of Fire Underwriters and published by the NFPA. Previous to 1931, the term was used in a 1921 issue of NFPA's *Quarterly* to reference fires compiled by the Journal of Commerce that caused losses of $1 million or more. The term was used even earlier in the October 1905 issue of the *Quarterly Bulletin of Special Hazards and Fire Record* to describe fires where the satisfactory activation of an automatic sprinkler system was reported and where the property damage that was described as "heavy" usually referred to water damage.

The Annual Conflagration Map format for reporting large-loss fires that was introduced by NFPA in 1931 continued for several years, establishing the definition of a large-loss fire as a fire that resulted in a direct dollar loss of $250,000 or more to a building and its contents. That monetary definition of a large-loss fire remained the same until 1978. During the 1970s, the number of large-loss fires reported each year to NFPA's Fire Analysis Division (formerly the Department of Records) increased considerably. It was quickly recognized that this phenomenon was due primarily to the rapid growth of monetary inflation (see graphs on the Inflation Factor) and its effect on property values. So in 1978, NFPA redefined a large-loss fire to be a fire resulting in a total direct loss of $500,000 or more. Based on further analysis and the continued dramatic increases in the number of large-loss fires being reported, in 1980 NFPA again redefined a large-loss fire as a fire resulting in a direct total loss of $1 million or more.

An explosion and fire caused extensive damage to this chemical manufacturing plant in Duluth, MN and injuries to nine persons, including one fire fighter. The explosion occurred when a static spark from an electrical motor apparently ignited dust from powdered fumaric acid. Fire fighters contained the fire and saved the plant's production area that stored liquid nitrogen, sulfuric acid, and malic acid. Loss was estimated at $6 million. (News Tribune, Duluth, MN)

THE INFLATION FACTOR

Continuing monetary inflation has led the NFPA to redefine a large-loss fire as one that caused $1 million or more of direct fire damage. Figure 1 illustrates the inflation of a $500,000 fire loss in 1971 dollars to a $1,178,900 loss in 1980 dollars, as measured by the Producer Price Index of the Bureau of Labor Statistics for 1971 to 1980. Inflation also increases the number of fires that qualify as large-loss fires. Figure 2 illustrates the number of verified fires of $1 million damage or more reported to the NFPA for each of the years 1971 through 1980.

Regardless of which index is used for adjustments, the Producer Price Index or Consumer Price Index, the number of fires resulting in a loss of $1 million or more that were reported to the NFPA was relatively constant, except for an increase in 1979 through 1980. This increase may have been the result of a more intense effort to collect fire data for these years. Since most of the large-loss fires and the resulting dollar losses occur in commercial properties, the Producer Price Index was selected to adjust dollar losses for inflation. This is appropriate because the Producer Price Index is based on the selling price of commodities of producers and manufacturers, as opposed to the Consumer Price Index, which is weighted towards the cost of goods and services purchased by the urban wage earner.

LARGE-LOSS FIRES UNADJUSTED FOR MONETARY INFLATION, 1977-1981

Year	No. of Fires	Loss	Average Loss/Fire
1981	285	$830,766,500	$2,914,969
1980	324	$947,684,100	$2,924,950
1979	248	$691,765,600	$2,789,377
1978	159	$463,925,400	$2,917,769
1977	129	$406,593,200	$3,151,883

Monetary inflation influences the average loss per fire both by increasing the total dollar loss for all large-loss fires and by qualifying as large losses those fires that would otherwise fall below the $1 million threshold.

LARGE-LOSS FIRES ADJUSTED FOR MONETARY INFLATION, 1977-1981

Year	No. of Fires	Loss	Average Loss/Fire
1981	126	$425,643,084	$3,378,119
1980	179	$571,831,299	$3,194,588
1979	162	$496,056,823	$3,062,077
1978	106	$381,024,494	$3,594,568
1977	129	$406,593,200	$3,151,883

Losses are adjusted for monetary inflation as measured by the Producer Price Index, 1977 to 1981, and using 1977 as the base year. The adjustment decreases both the number of fires resulting in a loss of $1 million or more and the total dollar loss for all large-loss fires.

The adjusted tables are important because they allow direct year-to-year comparisons. The statistical information presented in these tables may differ from previously published results since only verified losses of $1 million or more are included in the tables, and since losses have been updated to reflect additional loss information.

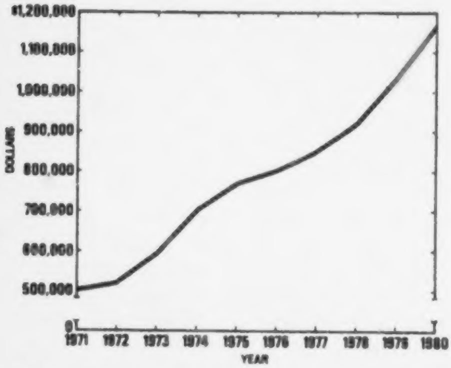


Fig. 1. $500,000 Fire Loss in 1971 Adjusted for Inflation as Measured by the Producer Price Indexes 1971 to 1980

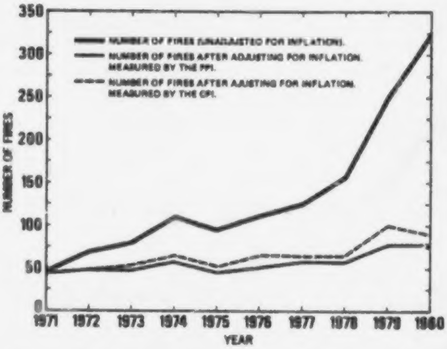


Fig. 2. Increase in Number of Large-Loss Fires as a Result of Monetary Inflation

LARGE-LOSS FIRES BY SIZE OF LOSS UNADJUSTED FOR MONETARY INFLATION, 1977-1981

	$1 Million and Over but less than $3 Million		$3 Million and Over but less than $10 Million		Over $10 Million	
Year	Fires	Loss	Fires	Loss	Fires	Loss
1981	227	$327,039,000	45	$207,086,000	13	$296,641,500
1980	259	$366,697,100	50	$218,980,600	15	$362,006,400
1979	196	$288,309,500	43	$191,956,100	9	$211,500,000
1978	133	$188,842,200	17	$ 75,549,900	9	$199,533,300
1977	104	$149,520,000	17	$ 78,590,000	8	$178,483,200

LARGE-LOSS FIRES BY SIZE OF LOSS ADJUSTED FOR MONETARY INFLATION, 1977-1981

	$1 Million and Over but less than $3 Million		$3 Million and Over but less than $10 Million		Over $10 Million	
Year	Fires	Loss	Fires	Loss	Fires	Loss
1981	94	$154,635,755	27	$139,510,956	5	$131,496,373
1980	143	$221,597,243	27	$136,179,501	9	$214,054,555
1979	126	$204,676,919	32	$160,319,644	4	$131,060,240
1978	83	$134,137,979	16	$ 80,305,730	7	$166,580,785
1977	104	$149,520,000	17	$ 78,590,000	8	$178,483,200

Adjusted for monetary inflation as measured by the Producer Price Index, 1977 to 1981, and using 1977 as the base year.

FREQUENCY OF FIRES

Property Division	1977	1978	1979	1980	1981	Totals
Public Assembly	12	17	22	25	27	103
Educational	7	7	11	27	23	75
Institutional	0	1	1	1	3	6
Residential	9	12	14	27	13	75
Stores and Offices	20	21	36	52	43	172
Basic Industry, Utility, Defense, and Communication	11	9	13	16	14	63
Manufacturing	32	42	63	85	80	302
Storage	27	33	60	69	49	238
Special	10	17	28	22	33	110
Undetermined	1					1
TOTALS	129	159	248	324	285	1,145

DOLLAR LOSS IN MILLIONS

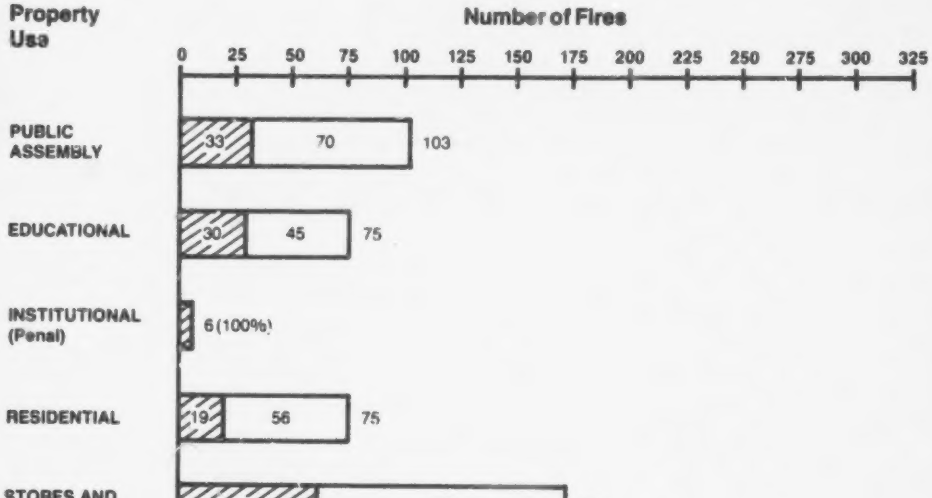
Property Division	1977	1978	1979	1980	1981	Totals
Public Assembly	52.18	45.96	43.54	55.13	51.62	248.43
Educational	11.66	13.49	25.87	52.80	44.62	148.44
Institutional	0	3.00	1.20	1.80	4.47	10.47
Residential	13.06	13.89	48.38	96.34	31.90	208.57
Stores and Offices	34.95	52.67	84.38	96.69	112.20	380.89
Basic Industry, Utility, Defense, Communication	111.78	16.65	24.48	48.57	89.58	291.06
Manufacturing	58.05	135.07	119.63	345.71	195.09	853.55
Storage	103.15	84.05	159.12	168.95	112.04	627.31
Special	20.76	94.15	185.15	81.69	189.25	571.00
Undetermined	1.00	0	0	0	0	1.00
TOTALS	406.59	463.93	691.75	947.68	830.77	3,340.72

These tables show both the frequency of large-loss fires and the corresponding dollar loss in millions for each major property division from 1977 to 1981. No adjustments have been made for monetary inflation. Dollar amounts may differ slightly due to rounding off.

Incendiary and Suspicious Large-Loss Fires

From 1977 to 1981, one out of every four large-loss fires was determined as incendiary or suspicious in origin (see graph below). Although three major property divisions, Manufacturing, Storage, Stores and Offices, experience the most large-loss fires respectively, Storage properties experience the most incendiary and suspicious large-loss fires, followed by the Stores and Offices, and then Manufacturing properties.

Not shown in the graph are the number of incendiary and suspicious fires reported for specific property types within their respective property divisions. For example, almost one out of of every two incendiary and suspicious large-loss fires within the Public Assembly division were church fires. Over 86 percent of the incendiary and suspicious fires within the Educational division were experienced by elementary, junior high, or high schools. All but one Institutional fire reported as incendiary occurred in a prison. For Stores and Offices, there were three large-loss incendiary or suspicious fires reported in store properties compared to one in an office building. The incidence of arson was not unique to any one of the specific manufacturing property types; these fires were evenly distributed within the Manufacturing division. For Storage properties, however, 35 percent of the large-loss incendiary and suspicious fires occurred in wood or paper product storage such as lumber yards, furniture storage, or paper storage. An additional 24 percent of these fires occurred in general item storage properties. Unoccupied properties, such as buildings under construction, accounted for 82 percent of the incendiary and suspicious large-loss fires reported for the Special Property division. Overall, the 318 incendiary and suspicious fires shown on the graph accounted for $798 million in direct property damage during the five-year period reported.



Incendiary and Suspicious Large-Loss Fires 1977-1980

Ignition Scenarios of Store Properties, United States, 1972–1981

Form of Heat of Ignition	*Ignition Factor*	*Percent of Fires*	*Percent of Dollar Loss*
Electrical equipment arcing, overloaded	Mechanical failure, malfunction	33.3	41.0
Open flame, incendiary device	Incendiary	27.2	23.2
Heating system	Mechanical failure, malfunction	5.6	3.7
Cigarette	Carelessly discarded	4.3	5.4

Based on 232 fires resulting in a dollar loss of $500,000 or more reported in the NFPA FIDO data. All dollar losses adjusted to 1972 dollars, using the Producer Price Index; total adjusted dollar loss was $151,027,690.

All percents in this Table refer to this data set.

Out of 37 distinct scenarios in this data set, these four scenarios accounted for 70.4 percent of the fires and 73.3 percent of the dollar loss.

Ignition Scenarios of Manufacturing Properties, United States, 1972–1981

Form of Heat of Ignition	*Ignition Factor*	*Percent of Fires*	*Percent of Dollar Loss*
Electrical equipment arcing, overloaded	Mechanical failure, malfunction	22.9	24.7
Open flame, incendiary device	Incendiary	11.5	6.4
Heat from hot object (friction, molten or hot material)	Mechanical failure, malfunction	11.3	10.9
Torch (cutting, welding)	Cutting, welding too close to combustibles	7.4	10.8
Fuel fired process equipment, heating systems	Mechanical failure, malfunction	7.1	9.3
Spontaneous ignition, chemical reaction	Operational deficiency	5.2	3.1
Heat from hot object (friction, molten or hot material)	Operational deficiency	3.4	3.1
Cigarette	Carelessly discarded	2.7	2.8

Based on 407 fires resulting in a dollar loss of $500,000 or more reported in the NFPA FIDO data. All dollar losses adjusted to 1972 dollars, using the Producer Price Index; total adjusted dollar loss was $395,772,130.

All percents in this Table refer to this data set.

Out of 51 distinct scenarios in this data set, these eight scenarios accounted for 71.5 percent of the fires and 71.6 percent of the dollar loss.

**Ignition Scenarios of Storage Properties,
United States, 1972–1981**

Form of Heat of Ignition	*Ignition Factor*	*Percent of Fires*	*Percent of Dollar Loss*
Open flame incendiary device	Incendiary	22.9	16.7
Electrical equipment arcing, overloaded	Mechanical failure, malfunction	17.7	16.5
Torches (cutting, welding)	Cutting, welding too close to combustibles	6.1	7.6
Heat from hot object	Mechanical failure, malfunction	5.8	6.0
Cigarette	Carelessly discarded	4.0	5.4
Spontaneous ignition, chemical reaction	Operational deficiency	4.0	2.8
*Exposure fire	Property too close	3.7	11.0
Heating systems	Mechanical failure, malfunction	3.7	3.4
Heating systems	Operational deficiency	3.4	4.2
Natural source	Lightning	3.1	2.8

Based on 327 fires resulting in a dollar loss of $500,000 or more reported in the NFPA FIDO data. All dollar losses adjusted to 1972 dollars, using the Producer Price Index; total adjusted dollar loss was $287,093,500.

All percents in this Table refer to this data set.

Out of 53 distinct scenarios in this data set, these ten scenarios accounted for 74.4 percent of the fires and 76.4 percent of the dollar loss.

* The disproportionate dollar loss percentage for this ignition scenario was influenced by a major fire that resulted in a total of $28 million in property damage to two warehouses.

IGNITION SCENARIOS

The term ignition scenario used in the tables describes the causes of large dollar-loss fires experienced by Store, Manufacturing, and Storage Properties. For each fire report with sufficicent information in the data set, a cause was determined by linking form of heat of ignition and ignition factor to build an ignition scenario.[3] The resulting causes or scenarios were then ranked by frequency of occurrence. It is the nature of large-loss fires, that in many cases there is not sufficient evidence for the cause to be determined by subsequent investigation. However, the available cause data are sufficient to identify fire problems that exist within certain property groups, and should be considered when evaluating strategies for fire prevention and protection.[4]

The technical terms, *form of heat of ignition* and *ignition factor*, were adapted from NFPA 901 *Uniform Coding for Fire Prevention, 1976* and are defined as follows:

Heat of Ignition: The heat energy which brings about ignition. Heat energy comes in various forms and usually from a specific object or source (e.g., heat from a match, heat from electrical equipment.)

Ignition Factor: The condition or situation that allowed a heat source and combustible material to combine to initiate a fire.

Occurrences of Large-Loss Fires

Figures 1 through 5 that follow profile the occurrence, method of discovery, and the operational status of the property for large-loss fires during 1981. Figure 1 shows that 61.6 percent of the large-loss fires for 1981 occurred between the hours of 6:00 p.m. and 6:00 a.m. Figure 2 shows that these fires were evenly distributed by day of the week, except for

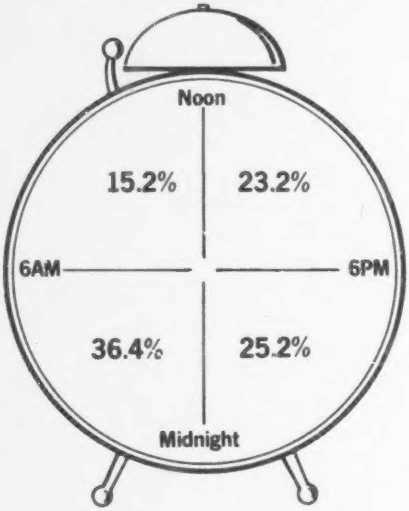


Fig. 1. Time Distribution of Large-Loss U.S. Fires for 1981 (based upon 250 fires)

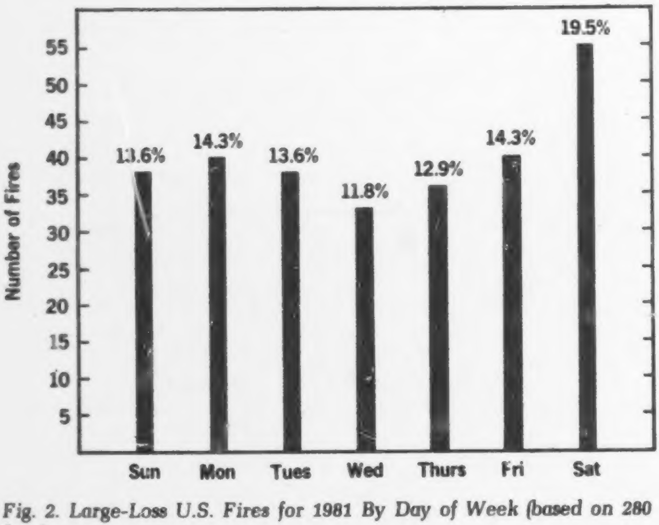


Fig. 2. Large-Loss U.S. Fires for 1981 By Day of Week (based on 280 fires)

Saturday. Figure 3 shows that the large-loss fires during 1981 were evenly distributed among the four calendar-year quarters. Figure 4 shows that for most large-loss fires, the property was unoccupied, and Figure 5 shows how the fires were detected. NFPA believes that it is accurate to conclude that many of the fires occurred during the night, gained considerable headway, and were not discovered until they were evident to a passerby.

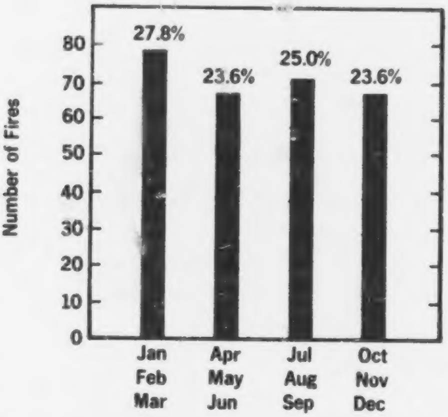


Fig. 3. Large-Loss U.S. fires for 1981 by Calendar-Year Quarters (based on 280 fires)

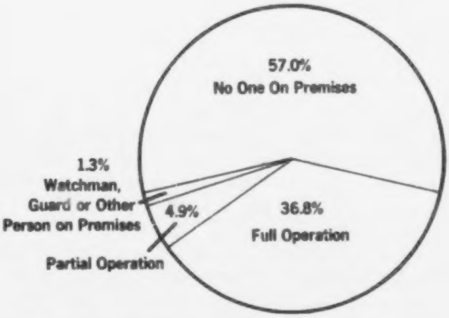


Fig. 4. Operating Status of Property in Large-Loss U.S. fires for 1981 (based on 223 fires)

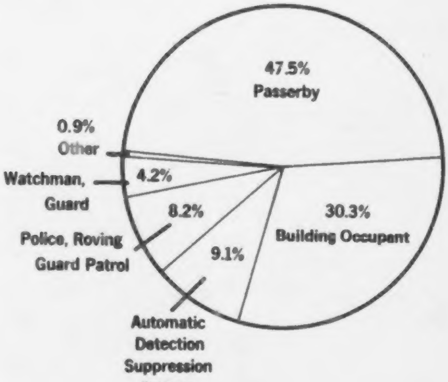


Fig. 5. Method of Detection in Large-Loss U.S. Fires for 1981 (based on 221 fires)

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[1] Michael J. Karter, Jr., "Fire Loss in the United States During 1981," *Fire Journal*, Vol. 76, No. 5 (September 1982), p. 68.

[2] G.P. McKinnon, ed., *Fire Protection Handbook*, Fifteenth Edition, Quincy, MA, National Fire Protection Association, p. 2-30, "Indirect Losses."

[3] Frederic B. Clarke, III and John Ottoson, "Fire Death Scenarios and Fire Safety Planning," *Fire Journal*, Vol. 70, No. 3 (May 1976), p. 20.

[4] *Reducing the Nation's Fire Losses, The Research Plan*, Center for Fire Research, National Bureau of Standards, January 1976.

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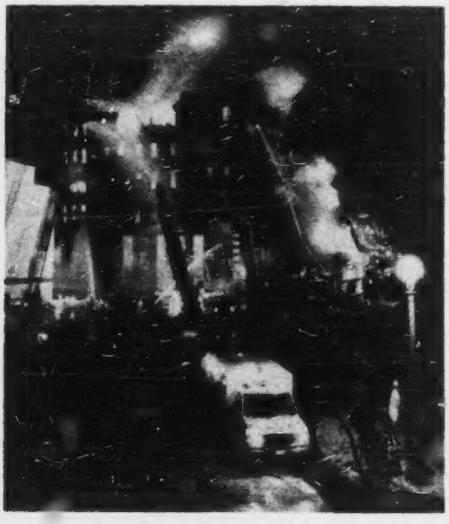
Industrial Arson

While the extent of industrial arson may be difficult to identify, according to a report of the National Institute of Law Enforcement and Criminal Justice, of businesses suffering a major loss from fire, 43 percent never resume operation, only 23 percent recover and fully resume operation, and at least 28 percent are out of business within 3 years.

Industrial arson is, in fact, a major problem. The following discussion takes a look at the who, why, where, how, and when of industrial incendiarism, plus defenses against such fires.



A suspected arson fire destroyed this eight-story brick and wood joist warehouse occupied by a corrugated box manufacturer in St. Paul, MN. Fire started on the first floor rear of the cardboard-filled building and quickly spread, causing the roof to collapse. The building was located in the southeast edge of downtown St. Paul, an area that houses many large, older manufacturing and warehouse operations. Damage estimates to the building exceeded $1 million. (Dispatch, St. Paul, MN)

ESTIMATES OF U.S. PROPERTY LOSS DUE TO INCENDIARY AND SUSPICIOUS FIRES IN STRUCTURES (1977-81)

	Property Loss				
Types of Fires	1977	1978	1979	1980	1981
Structure Fire of Incendiary Origin	$ 636,000,000	$ 650,000,000	$ 787,000,000	$1,158,000,000	$1,142,000,000
Structure Fire of Suspicious Origin	$ 384,000,000	$ 417,000,000	$ 541,000,000	$ 602,000,000	$ 516,000,000
Total Structure Fire of Incendiary and Suspicious Origin	$1,020,000,000	$1,067,000,000	$1,328,000,000	$1,760,000,000	$1,658,000,000

The estimates are based on data reported to the NFPA by fire departments that responded to the NFPA's Annual Survey of Fire Departments for U.S. Fire Experience (1977-81).

Dollar loss figures represent direct property loss only (loss to contents, structure, a vehicle, machinery, vegetation, or anything else involved in a fire), and do not include indirect losses (e.g., business interruption or temporary shelter costs). Dollar loss estimates are based on figures reported by departments for a year, and no adjustments were made for inflation over the five year period.

ESTIMATES OF U.S. FIRES DUE TO INCENDIARY AND SUSPICIOUS FIRES IN STRUCTURES (1977-81)

	Number of Fires				
Types of Fires	1977	1978	1979	1980	1981
Structure Fire of Incendiary Origin	86,500	87,000	88,500	92,000	88,000
Structure Fire of Suspicious Origin	81,000	73,000	60,000	54,000	66,500
Total Structure Fire of Incendiary and Suspicious Origin	167,500	160,000	148,500	146,000	154,500

The estimates are based on data reported to the NFPA by fire departments that responded to the NFPA's Annual Survey of Fire Departments for U.S. Fire Experiences (1977-81).

Who and Why

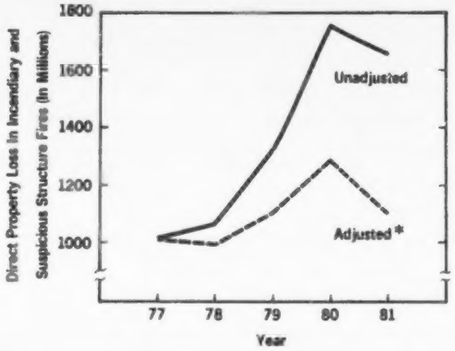
1. Employees

(a) To cover a crime, such as a shortage on the books due to embezzlement, an inventory shortage due to poor management, or an inside-directed theft and looting operation.

(b) To physically express a grievance against plant management, for real or alleged mistreatment, such as not receiving expected salary increases, not being promoted, or being disciplined by a supervisor.

(c) To retaliate against another employee for various reasons, such as the employee being promoted over the firesetter.

Direct property loss in incendiary and suspicious structure fires in the US (1977-81).



Source: NFPA's Annual Survey of Fire Departments for US Fire Experience (1977-81). *Adjusted for Inflation based on Consumer Price Index; 1977 used as base year.

2. Former Employees

(a) To protest against management for being laid off or furloughed from a job.

(b) To strike back at a supervisor or another employee as the individual responsible for the loss of employment.

Comment: Both employees and ex-employees are particularly dangerous as firesetters because they are familiar with the plant layout and operation, the location of critical areas, points of inadequately secured entrance, location of combustibles and accelerants, operation of the protective system, and general security procedures. To a degree, they can move about the plant with relative freedom and may even have keys to certain locked areas.

3. Competitors

(a) To put the industry out of business.

(b) To interrupt production, thereby causing the plant to lose a contract and providing opportunity for the competitor to secure the contract.

4. Customers

(a) To protest shabby treatment.

(b) To express anger over a faulty product.

5. Special Interest Social and Political Groups

(a) To demonstrate opposition to a product being manufactured or tests being conducted, or against current "fad" targets.

(b) To terrorize and to illustrate the capacity of the group to destroy the industrial facility.

(c) To sabotage plant operations and to reduce or halt production of items utilized by the military.

Comment: On occasion, the social and political interest groups may seem disorganized and lacking in leadership, but their persistent dedication to a cause makes them extremely dangerous. Members of these groups will risk physical harm and arrest to accomplish their goals.

Those individuals committing acts of sabotage, on the other hand, are often well-trained, equipped, and organized to carry out their assignment.

6. Security Personnel

(a) To receive recognition as a fire discovering, fire fighting, and fire extinguishing hero. Working conditions for night watchpersons are far from ideal — long, lonely hours, with little or no recognition or appreciation. The temptation is great for this person to set, discover, and extinguish a small fire. The company president and the company newspaper recognize and award the hero for "saving the plant."

(b) To justify their position, especially when rumors of cutbacks, reduction in force, or contracting with a private agency for security services are circulating.

(c) To ease concern on the part of management that the individual might be too old to perform effectively.

Comment: Security personnel who are physically fit, properly trained, equipped, and supervised can deter would-be arsonists. Qualified individuals can report weaknesses in the security system and respond quickly to emergency situations, such as locating a suspicious object or unauthorized persons on the facility premises. Their duties, responsibilities, and authority must be conveyed to security personnel in readily understandable language.

7. Employees or Outsiders During Labor Disputes

(a) To disrupt plant operations.

(b) To frighten management into settling the dispute.

(c) To intimidate those employees who remain on the job.

Comment: This group can be extremely dangerous as potential firesetters for many of the same reasons that employees and former employees may set fires. In addition to those factors cited under Comment in (1) and (2) above, it must be recognized that during a strike, management-level personnel may be responsible for plant security. These personnel are not familiar with plant protective systems and security procedures normally assigned to security personnel.

8. Intruders

(a) To cover another crime, such as burglary, theft, and pilferage.

(b) To divert security personnel to one area of the plant in order to commit a theft in another area.

(c) To destroy for destruction's sake. Malicious vandalism is often committed without any justifiable reason. Vandalism is identified as the motive for as high as 40 percent of all incendiary fires, and industrial facilities would be most logicial targets for this type of arsonist. Urban area plants would be especially susceptible where abandoned and vacant buildings offer easy access, with minimal security, and little chance of apprehending firesetters.

(d) To create excitement and derive satisfaction, perhaps sexual, from setting and watching the fire. These people fall into the general classification of pyromaniacs, although catagorizing them as emotionally or mentally disturbed individuals with a compulsion to set fires would be more accurate.

Where

1. Storage Locations

Reasons:

- Easy, safe access provides means of quick entry and exit.
- Hidden from view, therefore chances of discovery and interference are minimized.
- Supply of stacked or piled materials normally provides adequate fuel supply.
- Few employees are present, even during working hours.
- Fire cause is likely to be listed as accidental, with only a token investigation conducted.

- Clean-up operations may be initiated immediately after the fire is extinguished, in order to salvage as much stored material as possible and keep the plant in operation. This action makes an effective and productive investigation highly unlikely.

2. Vacant Buildings

Reasons:

- Easy access for juveniles, vandals, and vagrants who use the property to "hang out" or as sleeping quarters.
- Particularly vulnerable if exterior of building has deteriorated.
- Many of the same reasons for storage areas.

3. Docks and Platforms, Including Trucks and Railroad Cars

Reasons:

- Personnel moving in and out to load or unload materials make control difficult.
- Items being loaded or unloaded provide a source of fuel.
- Fire may be the smoldering type and may not break out or be discovered until trucks or railroad cars are some distance from the loading point.

4. Office and Sales Areas

Reasons:

- Less likely targets, as these areas are normally occupied during working hours and during non-working hours access is limited.
- Fuel supply is often limited.
- Motives for setting fires in these areas are not as varied as those of other sections of the facility.

How

Many factors influence how the arsonist sets a fire or fires. Of these factors, probably the most important is motive. Security people and investigators must carefully consider the method used, as this may enable them to establish a motive and take appropriate action both to prevent a repetition of the fire and apprehend the arsonist.

The determined arsonist may set two or more fires simultaneously. If the first attempt was unsuccessful, a second effort may be made within a week or two and may include the use of accelerants.

When

A leading insurer of industrial facilities reports that approximately 70 percent of a company's arson losses occur during non-daylight hours. This emphasizes the need for extremely tight security during hours of darkness, but by no means diminishes the importance of effective security measures during daylight hours.

Prevention and Control of Arson Losses

Arson prevention and control measures fall into two general categories: (1) inert, inanimate steps, such as fencing, lighting, alarm systems, locked doors and windows, etc., and (2) human, animate steps, such as controlling movement of personnel, screening and escorting visitors, recognizing security problems, etc.

1. Stable Controls

(a) *Fencing*. Whether used as perimeter barriers or protection for internal critical areas, fences offer several security advantages. They define the security area, reduce the number of security personnel required, and facilitate deployment of security forces. Although they can not guarantee complete denial of access, fences will delay intrusion to an area, and may serve as a psychological deterrent to a potential intruder. Additionally, fences channel the flow of traffic and personnel to those points controlled by security guards.

The value of a fence is determined by the length of time an intruder is delayed. A fence is only a minor obstacle to a determined intruder and additional features must be added to make penetration more difficult.

Such features include:

- Intrusion detection devices.
- Protective lighting.
- Clear zones, free of structures, trash containers, vegetation, or other objects that might prevent observation of movement and provide concealment for intruders. These areas should be established on both sides of a security fence. Temporary storage and parking should not be permitted in the clear zone and the grass in the zone must not be long enough to conceal a prone person.

(b) *Lighting*. Outdoor protective lighting will deter the intruder, improve the effectiveness of fencing, and provide increased visibility for security personnel. If the plant contains a "target" industry or has suffered one or more recent incendiary fires, the need for effective lighting becomes even more critical. Increased lighting is necessary in areas containing combustible material or flammable fuels.

Lighting is of four general types:

- Continuous, which consists of fixed units providing overlapping cones of light that completely illuminate an area.
- Command, similar to continuous, but activated either manually or automatically when necessary.
- Mobile or movable, which may be mounted on a security vehicle or hand carried by individuals.
- Emergency, which may involve all of the above, but has an independent emergency power source.

Comment: Light fixtures must be protected against tampering through the use of wire guards and should be installed on metal poles with protected internal wiring. Lighting must be inspected frequently to assure that it is in working condition.

(c) *Locks and other controls for doors and windows in critical areas.* Exterior doors and gates that are not supervised by security personnel should be kept locked at all times, if locking them does not interfere with plant operation or safe evacuation of personnel in an emergency.

Comment: When appropriate, doors, windows, and other entry points must be protected with bars, heavy wire mesh, or other safeguards. Points of entry should be checked frequently to assure that locks, hinges, frames, doors, windows, and gates are in good repair. If a fire occurs in a locked area, locks should be rekeyed or combinations changed. Locks should be replaced if there are indications that unauthorized personnel may have keys to these locks. Storage areas, fuse boxes, and electrical system controls must be secured against tampering.

(d) *Alarms*. Intrusion detection alarm systems are designed to detect, not prevent, an intrusion or attempted intrusion. To be of value, an alarm system must be supported by personnel who can effectively respond to the alarm and know what to do when they reach the location of the trouble which triggered the alarm.

For industrial facilities, two types of alarm systems are most frequently used:

- Central station alarms in which signals are relayed to a central station. Personnel located at that point will notify the police and request response by a patrol car, and in many instances will dispatch their own patrol units to the scene.

- Proprietary alarms in which signals are relayed to a location that is owned, staffed, and operated by the protected facility. This is effective only when the operation is of sufficient size to justify its own response personnel.

Comment: Regardless of the type of system used, precautions must be taken to insure that (1) the system is relatively tamperproof, (2) has an emergency power source and, (3) does not generate frequent nuisance alarms which interfere with plant operation, cause personnel to ignore them, and lead to a slower response to alarms by security personnel.

(e) *Good housekeeping*. Accumulation of trash, used work rags, and combustible debris must be avoided. Such items must be removed promptly, thus eliminating a fuel source for a potential arsonist. Trash should not be allowed to accumulate in mop rooms, stairways, storerooms, cafeteria and vending areas, or anywhere in the complex. Flammable liquids should be strictly controlled and stored in a properly safeguarded, locked area.

(f) *Sprinkler control valves*. Valves should be locked in the open position. Locks or other securing devices must be sturdy and must be inspected frequently when an industrial facility is identified as a likely target for arson.

(g) *Special precautions, vacant buildings*. These structures are often targets for fires by trespassers, including children, vandals, and vagrants.

Special arson prevention steps for vacant buildings include:

- Maintenance of building exterior and adjacent grounds.
- Adequately secured doors.
- Repaired or boarded-over broken windows.
- Sprinkler system capability maintained.
- Communication service for security personnel in the form of a two-way radio if telephone service is not available.

2. Human, animate preventative measures. The second category of controls involves, in the majority of cases, actions taken by individuals which impact on the behavior of other individuals. Such actions are not confined to those taken by security personnel, but involve plant personnel at various levels.

(a) *Management responsibility*. Since fires set by employees and former employees account for a significant number of incendiary industrial fires, management must strive to reduce the motivation for firesetting by these individuals. Supervisory personnel at all levels must attempt to maintain good relationships with employees and deal effectively with the disgruntled employee.

Perhaps of greater importance is the role which plant management must play in developing rapport with the community. Obviously, individuals in a hostile community are more likely to set fire to the facility and further will not be greatly concerned if the plant suffers from an incendiary fire, except for selfish reasons such as loss of employment.

(b) *Security personnel*. The duties and responsibilities of security personnel fall into three catagories: employee control, visitor control, and general security services.

(1) Employee Control

- Employees should be restricted to their own work areas, if practical, and should be allowed to leave these areas only for work-related reasons.
- Key to personnel control is identification. Entry into the plant or into restricted areas should be permitted only on the basis of personal recognition of the employee or proper display of a pass or badge. Personal recognition is practical only when the number of employees is 25 or less. Checking of passes has a tendency to become perfunctory and security personnel must be reminded frequently to check photographs, expiration dates and signatures, and to examine passes for signs of alteration and tampering.

- Within reasonable limits and respecting the rights of individuals, search must be conducted of all bundles and briefcases that workers carry into the building.

(2) Visitor Control

- Positive identification must be made of all vendors and service people. Individuals in uniforms seem to affect normal security procedures. It is significant that men posing as telephone repairmen had total access to survey an industrial facility for two weeks in preparation for coordinating one of the biggest incendiary industrial fires of all times.
- Visitors must register and furnish positive identification. All packages should be checked. Identification badges must be issued which are to be turned in on leaving the facility.
- Visitors should be escorted while on the premises, if possible. If this procedure is not practical, persons in the facility should be notified that they have visitors and requested to come to the security area to identify and assume security responsibility for these individuals until such time as they return to the security area. A somewhat less effective procedure is to notify persons in the plant that visitors are enroute to their office/work area and request that they inform security personnel when the visitors reach their destination. Whatever procedures are used, visitors must display issued passes at all times.
- Visitors must be limited to certain areas by whatever means are necessary. All plant personnel should be alert for strangers wandering around the property and should not hesitate to ask who they are and what they are doing in the area. Security people cannot be everywhere and every employee must contribute to plant security.

(3) General Security Services

- All entrances and exits should be guarded.
- Security patrols should be conducted around the clock. It is important to vary the pattern of these patrols, as intruders may study the timing and route of patrols and use this knowledge to plan the intrusion.
- All security systems, such as alarms, locks, fencing, and lighting must be checked periodically. Utilize the janitorial force in this program, making them an important element in the security network, particularly requesting that they be alert for changes in the normal appearance in public areas of the plant.

Actions Following an Incendiary Fire

There will be industrial arson fires; no facility is immune to the threat. In anticipation of this possibility, standard operating procedures should be developed for dealing with this situation. The procedures should specify who will be responsible for coordinating the investigation; and who will be on the investigation team, whether in-plant security personnel, local and/or state fire and law enforcement personnel, private investigators retained by the industry, or a combination of all of these.

Whatever procedures are developed, there are two major considerations:

- All fires, regardless how small, should be investigated. So-called "minor fires" may indicate the presence of an arsonist or may signal the beginning of a serious problem. If the fires persist, information on these minor fires may be essential in developing a pattern and studying the *modus operandi* of the firesetter.
- The area of origin of the fire should be left undisturbed until a thorough fire scene examination is completed. There may be pressure to downplay the fire, to clean up, to get back into production. Such action will make any possibility of a successful investigation, apprehension, and prosecution remote. If outside investigators are called in to participate, they should be given an opportunity to survey the scene, examine burn patterns, eliminate accidental causes, and in general, conduct an effective investigation.

OSHA Fire Brigade Regulations Explained

Background

In September, 1980, the Occupational Safety and Health Administration (OSHA) published new requirements for employee safety during fire emergencies and for employee fire brigades. The objective of the new requirements was to provide performance-oriented standards that would allow the employer to exercise one of five options at each facility. These options are explained later in this article.

Requirements

The new requirements are contained in Title 29 of the Code of Federal Regulations; specifically, Sections 1910.38 and 1910.156. The former section sets requirements for emergency action plans and fire prevention plans; the latter section sets requirements for fire brigades. It is important to understand that 29 CFR 1910.38, of itself, does not require an employer to provide either an emergency action plan or a fire prevention plan. However, if an employer is required to provide such a plan by another OSHA regulation or if he voluntarily elects to provide such a plan, then it must comply with 29 CFR 1910.38. Similarly, it is not OSHA's intent to mandate the formation of a fire brigade at each industrial facility. But, if a fire brigade is established, it must comply with 29 CFR 1910.156.

Elements of an Emergency Action Plan

The following elements of an emergency action plan are the minimum that must be addressed, according to 29 CFR 1910.38.

- Emergency evacuation routes and procedures.
- Procedures for shutdown of critical operations.
- Procedures to account for all employees after evacuation.
- Rescue and medical duties, if necessary.
- Means of reporting fires and other emergencies.
- Identification of persons who can provide information and explanation of the plan.

The plan must be in written form for facilities employing more than 10 persons. Section 1910.38 further sets requirements for an alarm system and for dissemination of the plan to employees.

Elements of a Fire Prevention Plan

The following elements of a fire prevention plan are the minimum that must be addressed, according to 29 CFR 1910.38.

- A list of major hazards and proper handling and storage procedures.
- Potential ignition sources and their control.
- Fire protection equipment or systems and their use.
- Identification of personnel responsible for fire protection equipment and systems.
- Identification of personnel responsible for control of fuel sources.
- Housekeeping.

The plan must be in written form for facilities employing more than 10 persons. Section 1910.38 sets further requirements for housekeeping, training, and maintenance.

Options for Handling a Fire Emergency

The employer may chose from five options in deciding how each facility will respond to a fire emergency:

1. Total evacuation — no fire fighting by employees.
2. All employees in the fire area will respond to fight the fire. (Except those assigned to emergency shutdown duties.)
3. Only designated employees in the fire area respond; all others either evacuate or are assigned to emergency duties.
4. An organized fire brigade will respond; all others in the fire area evacuate or are assigned to emergency shutdown duties.
5. An organized "structural" fire brigade will respond; all others in the fire area evacuate or are assigned to emergency shutdown duties.

It is important to understand that Options 2, 3, and 4 are only viable for incipient stage fires. OSHA defines an incipient stage fire as one which can be controlled or extinguished by portable extinguishers, Class II standpipe, or small hose (⅝ in. to 1½ in. diameter) without the need for protective clothing or breathing apparatus. Option 5 must be chosen if employees are expected to fight a fire that has gone beyond the incipient stage.

OSHA GUIDELINES FOR FIRE RESPONSE

Requirements	Option 1	Option 2	Option 3	Option 4	Option 5
Emergency Action Plan*	M	R	R	R	R
Evacuation Plan*	M	—	R	R	R
Fire Prevention Plan*	R	R	R	R	R
Alarms	M	M	M	M	M
Fire Brigade Organization Statement	—	—	—	M	M
Fire Brigade Training	—	—	—	Annually	Quarterly
Protective Equipment	—	—	—	NR	M
Medical Screening	—	—	—	NR	M

*May be mandatory per other OSHA Standards

Legend
M — Mandatory
NR — Not Required
R — Recommended

OSHA States

The US Occupational Safety and Health Administration has accepted the state OSHA plans for the following states:

Alaska
Arizona
California
Connecticut
Hawaii
Indiana
Iowa
Kentucky
Maryland
Michigan
Nevada
New Mexico
North Carolina
Oregon
South Carolina
Tennessee

Utah
Vermont
Virginia
Washington
Wyoming

Guam
Mariana
Puerto Rico
US Virgin Islands

Note: New York State has submitted a state OSHA plan for federal approval; however, as of October 1982, that approval has not been issued.

Average Cost of Hardware and Equipment for Industrial Fire Protection and Suppression

The following price ranges are as of mid-1982. Due to the constant fluctuation in prices, however, all prices listed here are subject to change. In addition, these prices represent single unit pricing; no adjustments have been made for competitive bidding or quantity discounts.

ITEM	PRICE RANGE
Detectors	
flame detector	$ 60.00
smoke/heat detector	[illegible]0.00
rate of rise/fixed temperature detector	13.00-1[illegible]
alarm horn	33.00
Extinguishers	
2 ½ gal stored-pressure, water-type	$40.00-50.00
2 ½ gal water pump type	65.00-108.00
halon	33.00-127.00
carbon dioxide	68.00-150.00
dry chemical (hand portable)	15.00-140.00
150 lb wheeled dry chemical	1,300.00-1,370.00
Class D (for metal)	250.00
First Aid Equipment	
first aid kit	40.00-80.00
backboard (short)	50.00
backboard (long)	110.00
fire blanket (with container)	37.75-126.00
water jel fire blanket	297.00
portable resuscitator/respirator	200.00-500.00
stretcher (folding)	78.00
stokes litter	125.00
Hoses, Nozzles, Etc.	
Fire Fighter Hose	
50 ft length, 1 ½ in., coupled	58.00
50 ft length, 1 ¾ in., coupled	67.00
50 ft length, 2 ½ in., coupled	92.00
50 ft length, 3 in., coupled	132.00
Industrial Hose	
1 ½ in.	1.06 per ft, coupled
2 ½ in.	1.76 per ft, coupled
linen hose reel (without hose or valve)	46.00-53.00
single jacket hose reel	50.00-68.00
double jacket hose reel	46.00-71.00
Nozzles	
standpipe nozzles (brass)	8.00-62.00
standpipe nozzles (chrome)	10.00-70.00

ITEM	PRICE RANGE
standpipe fog nozzle (brass)	23.00
Underwriter's playpipe	133.00
playpipe with removable fog nozzle, 2 ½ in. base	629.00
hydrant house	420.00-845.00
bypass eductor, 95 gal/min	600.00
hydrant wrench	18.00-25.00
spanner wrench	8.00
hose washer (portable)	388.00
3-inlet monitor	2,340.00
gated wye	150.00
Protective Clothing	
turnout coat	136.00-192.00
turnout pants	98.00-134.00
Nomex® jumpsuits	100.00-125.00
gloves (pair)	5.00-43.00
helmet	60.00-70.00
hard hat	5.45
Nomex® hood	21.00-26.00
safety hood	121.00-370.00
rubber boots (short)	49.00-60.00
rubber boots (long)	66.00-74.00
chemical suits	700.00-1,630.00
aluminized rescue suits	378.00-1,170.00
life belt	100.00
goggles	2.65-4.45
Safety Cans	
safety storage cans	27.00-39.00
safety dispensing cans	69.00-79.00
safety tilt can	125.00-373.00
oily waste cans	43.00-93.00
fire check waste paper receptacles	21.00-113.00
flammable liquids storage cabinet	530.00-710.00
Tools, Etc.	
fire cart	430.00-1,616.00
portable foam fire fighter's cart	1,650.00
hydraulic rescue kit (10 tons)	1,025.00
salvage cover	44.00-186.00
flashlight	8.00-35.00
axe	18.00-130.00
pike pole	32.00-112.00
hooligan tool	85.00-90.00
crowbar	16.00-32.00
rescue saw	1,050.00
hand lamps	20.00-115.00
emergency safety lights	75.00-298.00
smoke ejectors	345.00-820.00
portable electric power generators	529.00-2,800.00

People to Contact at NFPA with Technical Fire Protection Questions

Boilers and furnaces
Fossil fueled steam electric generating stations
Hydroelectric stations
Industrial trucks
Mines

Nuclear energy
Ovens and furnaces
Rapid transit systems
Waste water treatment facilities
Water cooling towers
John Anderson

Chemicals
Combustible metals
Explosion protection
Explosives
Fireworks
Industrial loss prevention
Plastics
Pyrotechnics
Robert Benedetti

Air conditioning
Building construction
Fire doors and windows
Incinerators, waste and linen handling
Solid fuel heating appliances
Vapor removal from commercial cooking equipment
John Bouchard

Electricity
National Electrical Code®, NFPA 70
John Cologgero
Peter Schram
Joe Tedesco

Fire tests
Life Safety Code®, *NFPA 101*®
Ronald Cote

Flammable liquids
Martin Henry

Extinguishing systems (water, foam)
Fire pumps
Foam systems
Forest products
Fur storage
General storage
Rack storage
Record protection
Rubber tires
Standpipe systems
Underground piping
Water sprays
Water tanks
Robert Hodnett

Marine
Charles Keller

Health care facilities
Burton Klein

Life Safety Code®, *NFPA 101*®
Parking garages
Repair garages
James Lathrop

Gases
Wilbur Walls

Detectors
Electronic computers
Emergency power supplies
Extinguishing systems (halon, dry chemical, CO_2)
Libraries, museums, historic buildings
Lightning protection
Mobile homes, RVs, dwellings
Portable extinguishers
Signal systems and fire detectors
Charles Zimmerman

Fire Research Laboratories

There are many laboratories in the United States capable of performing, to varying degrees, fire-related research. Broadly speaking, these laboratories can be classified into three general categories: 1. private and industrial laboratories, 2. university laboratories, and 3. government laboratories.

Representative laboratories in the private sector are Underwriters Laboratories Inc., Factory Mutual Research Corporation, and Southwest Research Institute; in the academic sector, Ohio State University; and in the government sector, the National Bureau of

Standards. Fire research is by no means limited to these laboratories. In fact, there has been a marked increase in research activity in recent years as a result of a heightened national interest in firesafety and health-related issues.

A good source of information on the extent of fire research and the laboratories involved in it in the United States is the *Directory of Fire Research*. It is published by the Committee on Fire Research of the Division of Engineering, National Research Council, National Academy of Sciences, 2101 Constitution Ave., Washington, DC 20418. The latest (8th edition) of the Directory is dated 1978 and is the last edition to be published by the National Academy of Sciences as part of the work of the Committee on Fire Research of the National Research Council. Work on that volume was in progress when the decision to disband the Committee was made.

The following descriptions of the activities of these representative laboratories are given to indicate the types of activities in which fire research-oriented laboratories are engaged. Inclusion in the listing is in no way an endorsement of the laboratories by the NFPA.

Underwriters Laboratories Inc.

Underwriters Laboratories Inc. (UL), with headquarters at 333 Pfingsten Rd., Northbrook, IL 60062, is a nonprofit corporation. Its sole objective is the promotion of public safety through conduct of "scientific investigation, study, experiments, and tests, to determine the relation of various materials, devices, products, equipment, constructions, methods, and systems to hazards appurtenant thereto or to the use thereof affecting life and property and to ascertain, define, and publish standards, classifications, and specifications for materials, devices, products, equipment, constructions, methods, and systems affecting such hazards, and other information tending to reduce or prevent bodily injury, loss of life, and property damage from such hazards."

The organization was founded in 1894 by the fire insurance industry under whose sponsorship it operated until 1968 when it became an independent, public service-type corporation. It has no capital stock, nor shareholders, and exists solely for the service it renders in the fields of fire, crime, and casualty prevention.

Factory Mutual Research Corporation

Factory Mutual Research Corporation (FM) is located at 1151 Boston-Providence Turnpike, Norwood, MA 02062. Its function is to conduct research and development in the field of property loss control. This activity serves the needs of the Factory Mutual System and is available to other entities, such as government agencies, trade associations, and individual businesses, through contracts.

The scope of the research ranges from basic research into the nature of fire to the development of standards for direct use by industry in establishing practices designed to minimize loss. Although such standards are intended primarily for Factory Mutual System members, they are recognized and widely used by others. Between the extremes of basic research and standards, major effort is made in the area of applied research. This activity includes: studies, surveys, operations research, experimentation, laboratory scale testing and full-scale testing to evaluate hazards and protection of storages, manufacturing operations, and construction arrangements.

Southwest Research Institute

The Southwest Research Institute (SwRI), located at 6220 Culebra Rd., San Antonio, TX 78284, is a nonprofit organization devoted to government and industrial research. SwRI's Department of Fire Technology has a staff of professional personnel encompassing disciplines of organic, physical, analytical, and polymer chemistry, chemical engineering, mechanical engineering, fire services technology, and inhalation toxicology. The Department is organized into four sections, each focusing on a different aspect of the technology of fire.

The Standard Testing Services section offers 35 tests, including ignition, flame spread, smoke development, and fire endurance. The Fire Performance Evaluations section conducts a wide variety of large-scale fire evaluations of materials and assemblies, often on a custom-designed basis. The section also performs many specialized large-scale tests including those for smoke detectors and fire penetration through seal installations at openings in fire barriers.

The Fire Chemistry Section offers services in combustion and fire gas analysis, along with the development of specialized analytical procedures as may be required. Heat release calorimetry, including the use of a room-sized calorimeter for the study of assemblies, is also offered.

The Applied Environmental Toxicology section conducts a variety of smoke toxicity tests using both standard and custom-designed methodology. Included in these studies are both lethality and incapacitation determinations, generally using rodents as animal models.

Center for Fire Research, National Bureau of Standards

The National Bureau of Standards' Center for Fire Research is located in the NBS complex at Gaithersburg, MD. The laboratory conducts research designed to improve codes and standards. This work is done by developing improved or new test methods and by the use of large-scale tests to validate the test method developments. Work is also conducted on developing knowledge of the properties of materials and their performance in fire conditions. The laboratories also develop mathematical models to predict performance of materials under fire conditions.

Ohio State University

Fire research at Ohio State University, Columbus, OH, includes a wide range of activities. The Building Research Lab in the College of Engineering, which includes the School of Architecture, maintains facilities for evaluating the performance characteristics of building materials and building construction systems. The fundamental combustion characteristics of structure designs, materials, and contents are also studied. Such data permit computer modeling of simulated fire scenarios, which can then be verified experimentally in full-scale compartment tests. These experiments can also include measurement and identification of the thermal and chemical products of combustion.

The bioeffects of fire exposure on both man and animals are studied in cooperation with the Colleges of Medicine and Veterinary Medicine. Studies of the human response to a fire emergency are examined by the College of Behavioral Sciences. Methods of improved audio and visual communications are developed by communications specialists and the Vision Research Institute. Problems in fire risk management are explored by The College of Administrative Sciences, with the campus community of the University serving as a testing ground for the fire prevention and control systems involved.

Listing of Fire Research Laboratories

The following list of fire research laboratories was current in 1978 when the 8th (and final) edition of the *Directory of Fire Research* was published. The listing includes information on the principal foreign laboratories working in fire research.

WE WANT TO KNOW . . .
if a name, an address, or a phone number has changed; if there's an upcoming event, a new program or course, a new publication being offered. If you have more current information than is contained in this *Almanac*, know something that should be included in this book, or just have something interesting about the fire protection scene that you want to contribute, please let us know. Write: Editor, *Fire Almanac*, NFPA, Batterymarch Park, Quincy, MA 02269. All suggestions will receive our careful attention.

Federal Government

Department of Agriculture

Agriculture Research Service
Southern Regional Research Center
P.O. Box 19687
New Orleans, LA 70719

Forest Service
Forest Products Laboratory
P.O. Box 5130
Madison, WI 53705

Forest Service
Intermountain Forest and Range Experiment Station
Northern Forest Fire Laboratory
Drawer G
Missoula, MT 59801

Forest Service
North Central Forest Experiment Station
Michigan State University
East Lansing, MI 48823

Forest Service
Pacific Northwest Forest and Range Experiment Station
P.O. Box 3141
Portland, OR 97208

Forest Service
Pacific Southwest Forest and Range Experiment Station
P.O. Box 245
Berkeley, CA 94701

Riverside Forest Fire Laboratory
P.O. Box 5007
Riverside, CA 92507

Forest Service
Rocky Mountain Forest and Range Experiment Station
240 W. Prospect St.
Fort Collins, CO 80521

Forest Hydrology Laboratory
Arizona State University
Tempe, AZ 85821

Forest Service
Southeastern Forest Experiment Station
Southern Fire Laboratory
P.O. Box 5106
Macon, GA 31208

Forest Service
Southern Forest Experiment Station
T-10210 Postal Services Building
701 Loyola Ave.
New Orleans, LA 70113

Forest Science Laboratory
P.O. Box 906
Starkville, MS 39759

Department of the Army

Air Mobility Research and Development Laboratory
Fort Eustis, VA 23604

Frankford Arsenal
Pitman-Dunn Laboratory
Philadelphia, PA 19137

Materials and Mechanics Research Center
Organic Materials Laboratory
Watertown, MA 02172

Mobility Equipment Research and Development Command
Fort Belvoir, VA 22060

Natick Research and Development Command
Kansas St.
Natick, MA 01760

Tank-Automotive Research and Development Command
28251 Van Dyke Ave.
Warren, MI 48090

Department of Commerce

National Bureau of Standards
Center for Fire Research
Washington, DC 20234

Department of the Interior

Bureau of Mines
Pittsburgh Mining and Safety Research Center
4800 Forbes Ave.
Pittsburgh, PA 15213

Spokane Mining Research Center
E. 315 Montgomery Ave.
Spokane, WA 99207

Department of the Navy

National Naval Medical Center
Naval Medical Research Institute
Bethesda, MD 20014

National Parachute Test Range
Materials Laboratory Department
El Centro, CA 92243

Naval Air Development Center
Warminster, PA 18974

Naval Research Laboratory
4555 Overlook Ave.
Washington, DC 20375

Naval Ship Engineering Center
Philadelphia, PA 19112

Naval Training Equipment Center
Orlando, FL 32813

Department of Transportation
Federal Aviation Administration
National Aviation Facilities Experimental Center
Atlantic City, NJ 08405

National Aeronautics and Space Administration
Ames Research Center
Code SC, Mail Stop 223-6
Moffett Field, CA 94035

Lewis Research Center
21000 Brookpark Rd.
Cleveland, OH 44135

State Government

New York State Department of Health,
Burns Care Institute
Tower Building, Room 557
Empire State Plaza
Albany, NY 12237

Universities

Brown University
Providence, RI 02912

University of California at Berkeley
Department of Mechanical Engineering
Berkeley, CA 94720

University of California/Livermore
Lawrence Livermore Laboratory
P.O. Box 808
Livermore, CA 94550

University of California/San Diego
Department of Applied Mechanics and Engineering Sciences
La Jolla, CA 92093

Cornell University
Sibely School of Mechanical and Aerospace Engineering
Ithaca, NY 14853

Duke University Medical Center
F.G. Hall Laboratory for Environmental Research
Durham, NC 27710

Georgia Institute of Technology
School of Aerospace Engineering
Atlanta, GA 30332

School of Mechanical Engineering
Atlanta, GA 30332

Harvard University
Division of Engineering and Applied Physics
Cambridge, MA 02138

University of Illinois at Chicago Circle
Department of Energy Engineering
Box 4348
Chicago, IL 60680

University of Illinois
Combustion Laboratory
Urbana, IL 61801

The Johns Hopkins University
Applied Physics Laboratory
Johns Hopkins Rd.
Laurel, MD 20810

Louisiana State University
School of Forestry and Wildlife Management
Baton Rouge, LA 70803

University of Maryland
Department of Textiles and Consumer Economics
College Park, MD 20742

Fire Protection Curriculum
College of Engineering
College Park, MD 20742

University of Michigan
School of Public Health
Ann Arbor, MI 48109

University of Minnesota
Heat Transfer Laboratory
Mechanical Engineering Department
Minneapolis, MN 55455

University of Montana
Wood Chemistry Laboratory
Missoula, MT 59801

Polytechnic Institute of New York
Chemistry Department
333 Jay St.
Brooklyn, NY 11201

University of Notre Dame
Department of Aerospace and Mechanical Engineering
Notre Dame, IN 46556

University of Oklahoma
Flame Dynamics Laboratory
1215 Westheimer Dr.
Norman, OK 73069

Pennsylvania State University
Noll Laboratory for Human Performance Research
University Park, PA 16802

University of Pittsburgh
Graduate School of Public Health
130 DeSoto St.
Pittsburgh, PA 15261

Purdue University
Engineering Experiment Station
West Lafayette, IN 47907

University of Utah
Flammability Research Center
Salt Lake City, UT 84112

University of Washington
College of Forest Resources, AR-10
Seattle, WA 98198

Private and Industrial Laboratories

Albany International Corp.
Fire Research Laboratory
1000 Providence Highway
Dedham, MA 02026

American Cyanamid Co.
Chemical Research Division
1937 W. Main St.
Stamford, CT 06904

Chemical Research Division
Bound Brook, NJ 08805

The Ansul Co.
Research and Development Laboratory
One Stanton St.
Marinette, WI 54143

Auerbach Associates, Inc.
121 North Broad St.
Philadelphia, PA 19107

Brookhaven National Laboratory
Fire Protection Group
Building 535
Upton, NY 11973

Celanese Research Co.
P.O. Box 1000
Summit, NJ 07901

Chemonics Industries
Fire-Trol Laboratory
P.O. Box 21568
734 E. Southern Pacific Dr.
Phoenix, AZ 85036

E. I. du Pont de Nemours and Company, Inc.
Haskell Laboratory
1007 Market St.
Wilmington, DE 19898

FMC Corporation
Ordnance Engineering Division
1105 Coleman Ave.
San Jose, CA 95108

Engineered Systems Division
Advanced Mining Systems
328 Brokaw Rd.
Box 450
Santa Clara, CA 95052

Factory Mutual Research Corporation
1151 Boston-Providence Turnpike
Norwood, MA 02062

Falcon Research and Development Co.
1225 S. Huron St.
Denver, CO 80223

The Firestone Tire and Rubber Co.
Central Research Laboratories
1200 Firestone Parkway
Akron, OH 44317

Forensic Engineers, Inc.
6233 Brookview Ave., S.
Edina, MN 55424

Gage-Babcock and Associates, Inc.
135 Addison Ave.
Elmhurst, IL 60126

General Electric Co.
Materials Analysis and Test Laboratory
1285 Boston Ave.
Bridgeport, CT 06602

Corporate Research and Development
3135 Easton Turnpike
Fairfield, CT 06431

Plastics Laboratory
Major Appliance Laboratories
Appliance Park 35-1113
Louisville, KY 40225

General Electric Co.
Central Research
Plastics Division
One Plastics Ave.
Pittsfield, MA 01201

B.F. Goodrich Chemical Co.
P.O. Box 122
Avon Lake Technical Center
Avon Lake, OH 44012

Gulf and Western Manufacturing Co.
Gamewell/Alarmtronics Division
91 Bartlett St.
Marlboro, MA 01752

Horizons Research Inc.
23800 Mercantile Rd.
Cleveland, OH 44122

Hough Laboratory
P.O. Box 1505
Springfield, OH 45501

Hughes Aircraft Co.
Santa Barbara Research Center
75 Coromar Dr.
Goleta, CA 93017

Arthur D. Little, Inc.
Acorn Park
Cambridge, MA 02140

IIT Research Institute
10 W. 35th St.
Chicago, IL 60616

Lockheed-California Co.
Rye Canyon Laboratories
P.O. Box 551
Burbank, CA 91520

McDonnell Douglas Corp.
Douglas Aircraft Co.
Biomedical Laboratory
3855 Lakewood Blvd.
Long Beach, CA 90846

McGraw-Edison Co.
Edison Electronics
4421 Rice St.
Chicago, IL 60651

Electronics Division
333 W. River Rd.
Elgin, IL 60120

Michigan Chemical Corp.
Technical Center
1975 Green Rd.
Ann Arbor, MI 48105

Minnesota Mining and Manufacturing Co.
Fire Protection Systems Dept.
3M Center Building 236-1
St. Paul, MN 55101

Mission Research Corp.
Civil Analysis Group
P.O. Drawer 719
735 State St.
Santa Barbara, CA 93102

Monsanto Co.
800 N. Lindbergh Blvd.
St. Louis, MO 63166

National Smoke, Fire, and Burn
Institute, Inc.
53 State St.
Boston, MA 02109

PPG Industries, Inc.
Resin Products Technical Center
P.O. Box 127
Springdale, PA 15144

Petrolite Corporation
Tretolite Division Research
369 Marshall Ave.
St. Louis, MO 63119

Phoenix Chemical Laboratory, Inc.
3953 W. Shakespeare Ave.
Chicago, IL 60647

Portland Cement Assn.
Research and Development
Construction and Technology Laboratories
5420 Old Orchard Rd.
Skokie, IL 60076

The Rand Corp.
1700 Main St.
Santa Monica, CA 90406
New York City Rand Institute (now closed)

Raybestos Manhattan Industrial
Products Co.
P.O. Box 5205
Garco and O'Hear Sts.
North Charleston, SC 29406

Research Triangle Institute
Center for Population
and Urban-Rural Studies
P.O. Box 12194
Research Triangle Park, NC 27709

Science Applications, Inc.
1257 Tasman Dr.
Sunnyvale, CA 94086

Scientific Service, Inc.
1536 Maple St.
Redwood City, CA 94063

Southwest Research Institute
P.O. Drawer 28510
San Antonio, TX 78284

Standard Oil Company of Indiana
Amoco Oil Company Research and Development
Amoco Research Center
P.O. Box 400
Naperville, IL 60540

Technical Fire Investigation Services
3109 B NE 59th St.
Vancouver, WA 98663

Textile Research Institute
Princeton, NJ 08540

TRW Systems Group
Engineering Sciences Laboratory
1 Space Park
Redondo Beach, CA 90278

Underwriters Laboratories Inc.
207 E. Ohio St.
Chicago, IL 60611
1285 Walt Whitman Rd.
Melville, NY 11746

Union Carbide Corp.
Safety Research Laboratory
270 Park Ave.
New York, NY 10017

United States Borax and Chemical Corp.
U.S. Borax Research Corp.
412 Crescent Way
Anaheim, CA 90010

United States Testing Co., Inc.
Biological Services Division
1415 Park Ave.
Hoboken, NJ 07030

University Engineers, Inc.
1215 Westheimer Dr.
Norman, OK 73069

Foreign Laboratories

Governmental

Department of Construction
Experimental Building Station
P.O. Box 30
Chatswood, New South Wales
AUSTRALIA 2067

Department of the Environment
Forest Fire Research Institute
240 Bank Street
Ottawa, Ontario
CANADA

Department of the Environment
Great Lakes Forest Research Centre
1219 Queen Street East
P.O. Box 490
Sault Ste. Marie, Ontario
CANADA P6A 5M7

Department of the Environment
Northern Forest Research Centre
Edmonton, Alberta
CANADA

National Research Council of Canada
Fire Research Section
Division of Building Research
Ottawa, Ontario
CANADA K1A OR6

Kobenhavns Brandvaesen
(Copenhagen Fire Department)
Kobenhavns Brandvaesens Laboratorium
og Tekniske Bibliotek
H. C. Andersens Boulevard 23
DK 1553
Kobenhanv V.
DENMARK

(It is expected that the Laboratory and the Technical Library will be transferred to the Danish Academy of Technical Sciences (STV), The Danish Fire Research and Development Group, Park Alle' 345, Copenhagen, DK 2600 Glostrup, DENMARK.)

Home Office
United Kingdom
Science Advisory Branch
Fire Research Division
Horseferry House
Dean Ryle Street
London SW1P 2AW
ENGLAND

Department of the Environment
Building Research Establishment
Fire Research Station
Melrose Avenue
Borehamwood, Hertfordshire, WD6 2BL
ENGLAND

Centre National de Prevention
et de Protection Station d'Essais
et Laboratoire du Feu
Route de Noisy-le-Grand
77 Champs-sur-Marne
FRANCE

Centre National de la
Recherche Scientifique (C.N.R.S.)
Centre de Recherche sur la Chimie
de la Combustion et les Hautes Temperatures
45045 Orleans
FRANCE

Centre National de la
Recherche Scientifique (C.N.R.S.)
Service d'Analyse des Gaz
4, Avenue de l'Observatoire
75270 Paris Cedex 06
FRANCE

Centre National de la
Recherche Scientifique (C.N.R.S.)
Laboratoire d'Energetique et de Detonique,
E.N.S.M.A.
Rue Guillaume VII
86034 Poitiers Cedex
FRANCE

Centre Scientifique et Technique
du Batiment
4, Avenue du Recteur-Poincare
75782 Paris Cedex 16
FRANCE

Centre Technique du Bois (CIB)
Laboratoire du Feu
10, Avenue de Saint Mande
75012 Paris
FRANCE

Ministere de l'Interieur
Direction de la Securite Civile
18 Rue Ernest Cognacq
92300 Levallois-Perret
FRANCE

Physikalisch-Technische Bundesanstalt
Bundsallee 100
3300 Braunschweig
FEDERAL REPUBLIC OF GERMANY

Building Research Institute
Ministry of Construction
Organic Section
Materials Division
3-Chome Hyakunin-cho
Shinjuku-ku
JAPAN

Ministry of Home Affairs
Fire Defense Agency
Fire Research Institute
14-1, Nakahara 3 Chome
Mitaka, Tokyo
JAPAN

Diputacion Provincial de Barcelona
Laboratorio General de Ensayos e Investigaciones
Departmento de Ignifugacion
c/. Urgel 187, Barcelona-11
SPAIN

Laboratorio del Fuego de Barcelona
Cuerpo de Bomberos del Ayuntamiento de Barcelona
c/. Lerida, No. 30, Barcelona
SPAIN

National Board of Rescue
and Fire Services
Analytical Department
Arrhenius Laboratory
University of Stockholm
Box 6029
S-102 31 Stockholm
SWEDEN

National Defense Research Institute
P.O. Box
S-104 50 Stockholm 80
SWEDEN

Research Institute for
Protective Construction
Auf der Mauer 2
CH-8001 Zurich
SWITZERLAND

Swiss Federal Laboratory for
Materials Testing and Research (EMPA)
Uberlandstrasse 129
CH-8600 Dubendorf
SWITZERLAND

Zurich City Police
Scientific Service
Zeughausstrasse 11
8004 Zurich
SWITZERLAND

Universities

Monash University
Geophysical Fluid Dynamics Laboratory
Clayton, Victoria 3168
AUSTRALIA

State University of Ghent
Laboratory for Fuel Technology and Heat Transfer
St. Pietersnieuwstraat, 25
(B) 9000 Ghent
BELGIUM

Queen's University
Kingston, Ontario
CANADA

University of Waterloo
Mechanical Engineering Department
Waterloo, Ontario
CANADA N2L 3G1

King's College London
Department of Civil Engineering
Strand, London WC2R 2LS
ENGLAND

Sheffield University
Department of Chemical Engineering
and Fuel Technology
Sheffield S1 3JD
ENGLAND

University of Southampton
Department of Aeronautics
and Astronautics
Southampton S09 5NH
ENGLAND

Universite de Paris-Sud
Laboratoire de Toxicologie
Faculte de Pharmacie
Rue J. B. Clement
92290 Chatenay-Malabry
FRANCE

Technischen Universitat Braunschweig
Institut fur Baustoffkunde und Stahlbetonbau
Beethovenstrasse 52
D 3300 Braunschweig
FEDERAL REPUBLIC OF GERMANY

Gesamthochschule Duisburg
Forschungsgruppe Automatische Brandentoleckung
GH-Duisberg FB9
Bismarckstrasse 81
D-41 Duisburg
FEDERAL REPUBLIC OF GERMANY

Universitat Karlsruhe (T.H.)
Forschungsstelle fur Brandschutztechnik
Hertzstrasse 16
D-7500 Karlsruhe 21
FEDERAL REPUBLIC OF GERMANY

Institut fur Holzforschung der Universitat Munchen
Brandlabor, Winzerstrasse 45
D 8000 Munchen 40
FEDERAL REPUBLIC OF GERMANY

Universitat Stuttgart
Abteilung Brandverhalten und Brandschutz
Otto-Graf-Institut
Pfaffenwaldring 4
D 700 Stuttgart 80
FEDERAL REPUBLIC OF GERMANY

University of Edinburgh
Department of Fire Safety Engineering
King's Buildings
Mayfield Road
Edinburgh EH9 3JL
SCOTLAND

Chalmers University of Technology
Division of Building Construction
Fack, S-402 20 Goteborg 5
SWEDEN

Private and Industrial Laboratories

Versuchs-und Forschungsanstalt der Stadt Wien
Rinnbockstrasse 15
1110 Wien
AUSTRIA

Fulmer Research Institute, Ltd.
Yarsley Testing Laboratories
The Street
Ashtead, Surrey
ENGLAND

QMC Industrial Research, Ltd.
229 Mile End Road
London E1 4AA
ENGLAND

Shell International Petroleum Co., Ltd.
Shell Research Ltd.
Thornton Research Centre
P.O. Box 1
Chester CH1 3SH
ENGLAND

Timber Research and Development Association
Wood Technology Department
TRADA House
Stocking Lane
Hughenden Valley
High Wycombe, Buckinghamshire
ENGLAND

Wilkinson Match Ltd.
(Graviner Ltd.)
Safety and Protection Division
448 Bassingstoke Road
Reading, Berkshire, RG2 OQD
ENGLAND
Research Division
Poyle Road
Colnbrook, Slough SL3 OHA
ENGLAND

Federation Nationale du Batiment
Union Technique Interprofessionnelle
COSTIC
9 Rue Laperause
75016 Paris
FRANCE

Allianz Versicherungs-AG
Allianz-Zentrum fur Technik GmBH
Krausstrasse 14, 8045 Ismaning
FEDERAL REPUBLIC OF GERMANY

Bergbau-Forschung GmBH
Forschungsinstitut des Steinkohlenbergbauvereins
Hauptstelle fur das Grubenrettungswesen
Schonscheidtstrasse 28
4300 Essen 13 (Kray)
FEDERAL REPUBLIC OF GERMANY

Institut fur Bautechnik
Reichpietschufer 72-76
1000 Berlin 30
FEDERAL REPUBLIC OF GERMANY

Institute for Damage Prevention and Damage Research
e. V., Gartenstrasse 4-10
23 Kiel I
FEDERAL REPUBLIC OF GERMANY

Registro Italiano Navale
Laboratorio Studi Antincendio
Via Corsica 12
16128 Genova
ITALY

Japan Fire Equipment Inspection Corporation
14-1, 3-Chome, Nakahara
Mitaka-shi, Tokyo, 181
JAPAN

Kokusai Gijutsu Kaihatsu Company, Ltd.
2-4-1 Amanuma Suginami
Tokyo, 167
JAPAN

Veg-Gasinstituut n.v.
Wilmersdorf 50
Apeldcorn
THE NETHERLANDS

Swedish Forest Products Research Laboratory
Fiber Building Board Department
Box 5604
S-114 86 Stockholm
SWEDEN

Swedish Institute of Steel Construction
Drottning Kristinas vag 48
S-114 28 Stockholm
SWEDEN

Brand-Verhutungs-Dienst
Nuschelerstrasse 45
8001 Zurich
SWITZERLAND

Cerberus, Ltd.
Fire Division Research and Development
CH-8707
Mannedorf
SWITZERLAND

Swiss Fire Brigade Association
Ensingerstrasse 37
CH-3000
Bern 16
SWITZERLAND

Swiss Reinsurance Company
Division of Fire Protection Engineering
P.O. Box 172 CH-8022
Zurich
SWITZERLAND

Testing Laboratories

For many years, the phrase "a nationally recognized testing laboratory" was used somewhat indiscriminately to call attention to the sources for testing of products and assemblies to determine if they met performance (and sometimes specification) requirements of fire protection standards. Thus, a standard user would be directed to use only products and assemblies that had been "listed" or "approved" by a nationally recognized testing laboratory if compliance with certain provisions of the standard in question was the goal. Unfortunately, there was always a gnawing doubt about what exactly was a "nationally recognized testing laboratory"; thus, the phrase has been dropped from NFPA published documents.

An effort to bring order to the question of identifying technically competent testing laboratories in a consistent and uniform fashion has been established within the framework of the U.S. Department of Commerce (DOC). It is the National Voluntary Laboratory Accreditation Program (NVLAP) established in 1976 with the goal "to serve on a timely basis the needs of industry, consumers, the government, and others by accrediting the nation's testing laboratories." In the context of U.S. standardization activities, NVLAP fits between standards development and promulgation on the one hand and activities related to product assurance and certification on the other.

The first accreditations under the NVLAP program were announced in October 1979. In that announcement, a total of 30 laboratories representing 20 organizations were accredited for certain test methods, including a fire test for thermal insulation materials. Among the laboratories receiving the accreditation were Underwriters Laboratories, Inc. and Factory Mutual Research Corp., two organizations with historical preeminence in the fire testing field.

Accreditation of a laboratory is based on criteria that generally focus on a laboratory's overall operation, including organization and technical direction, ethical and professional business practices, and the quality control system used by the laboratory. Other more specific criteria focus on the personnel, equipment, facility, procedures and recordkeeping for performing and reporting test results.

To gain accreditation, an organization must submit a request for an application in an established laboratory accreditation program (LAP) to the DOC through its Office of Products Standard Policy (OPSP) which forwards it to the office of Testing Laboratory Evaluation Technology of the National Bureau of Standards. The NBS makes an assessment of the laboratory's performance using the general and specific criteria mentioned earlier, on the basis of (1) written information submitted with the original request, (2) an on-site examination, and (3) results of proficiency testing that may be required. Based on the technical assessments, NBS recommends either granting or denying accreditation to OPSP, which then makes the final decision.

If accredited, a certificate of accreditation is sent to the laboratory along with a list of specific test methods for which accreditation is granted. It takes about eight months to establish accreditation for a laboratory (about two years if a new LAP in a new product area has to be established). The procedures contain provisions for periodic re-accreditation.

LAP Status

By the end of 1982 there were three established LAPs:

1. *Insulation LAP* The Insulation LAP for thermal insulation materials with 57 test methods for which accreditation may be granted. Thirty-nine laboratories are currently accredited to perform one or more of these test methods.

2. *Concrete LAP* The Concrete LAP for freshly mixed field concrete has two groups of test methods and one optional test method for which accreditation can be granted. Fifty laboratories are currently accredited under the Concrete LAP.
3. *Carpet LAP* The Carpet LAP for carpet has 12 test methods for which accreditation may be granted. Twenty-five laboratories are currently accredited for one or more of these test methods.

LAPs Under Development

1. *Stove LAP* The formal establishment of a Laboratory Accreditation Program for Solid Fuel Room Heaters (Stove LAP) was announced on April 20, 1982 in the Federal Register (47 FR 16823-16827). Several laboratories have already applied for accreditation under this LAP. On-site assessments and proficiency testing were expected to begin in late summer of 1982.
2. *Acoustics LAP* Copies of the minutes of the Acoustics LAP workshops held at NBS in early 1982 were sent to nearly 200 people for comments and suggestions. Comments on the minutes and appendices were received and analyzed. Those that were acceptable were incorporated in the NVLAP documents. A *Federal Register* announcement of the Acoustics LAP test methods for which laboratories can request accreditation was planned for the third quarter of 1982.
3. *Dosimetry LAP* Information gathered from the workshop, which was held at the National Bureau of Standards on April 12 and 13, 1982, will be used to establish a uniform basis for the determination of each processor's compliance with NVLAP criteria.
4. *Electromagnetic Calibration Services LAP* A final finding of need for a LAP which will be offered to laboratories who provide electromagnetic calibration services was published on January 14, 1982. A public workshop to discuss the technical requirements for this LAP was held on July 1 and 2, 1982. An analysis of workshop comments is in progress. A notice announcing the formal establishment of this LAP was expected in the fourth quarter of 1982.
5. *Windows and Doors LAP* On January 21, 1982 a notice was published in the *Federal Register* (47 FR 3025-3026) announcing a request from the Department of Housing and Urban Development (HUD) to establish a Laboratory Accreditation Program for window and door products. In a letter to NBS dated May 12, 1982, HUD withdrew its request so that other interested parties could act as proponents of the proposed program. The notice announcing the HUD decision was published in the *Federal Register* (47 FR 23509-23510) dated May 28, 1982.

As a result of the HUD decision, NBS has received a letter from a private testing laboratory requesting that NBS establish a LAP covering those testing laboratories that test window and door products.

A preliminary finding of need for this program requesting comments to ascertain the overall support for the proposed LAP is being developed and was to be published in a *Federal Register* notice during the third quarter of 1982.

Directory of NVLAP Accredited Laboratories

The U.S. Department of Commerce, National Bureau of Standards, National Voluntary Laboratory Accreditation Program publication: NVLAP, Fifth Annual Report and Directory of Accredited Laboratories (NBS Special Publication 636, issued September 1982), and related updates printed in the *Federal Register* provide an up-to-date listing of the NVLAP accredited laboratories.

A typical listing, as reprinted below for Factory Mutual Research Corp., includes the test methods for which the laboratory is accredited.

Factory Mutual Research Corp., Attn: Philip E. Johnson, 1151 Boston-Providence Turnpike, Norwood, MA 02062, Phone: (617) 762-4300.

NVLAP Code	Test Method Designation	Short Title (property) Subtitle (if applicable)
01/C02	HH-I-515 (para. 4.8.5 in D version, Amendment 1)	Corrosiveness; Cellulosic fiber (loose-fill)
01/D25	HH-I-515 (para. 4.8.3 in D version, Amendment 1)	Moisture absorption; Cellulosic fiber (loose-fill)
01/D26	HH-I-515 (para. 4.8.1 in D version, Amendment 1)	Settled density; Cellulosic fiber (loose-fill)
01/F02	ASTM E84	Surface burning characteristics; Building materials
01/F07	HH-I-515 (para. 4.8.7 in D version, Amendment 1)	Critical radiant flux; Radiant Panel (cellulosic fiber, loose-fill)
01/F08	HH-I-515 (para. 4.8.8 in D version, Amendment 1)	Smoldering combustion; Cellulosic fiber (loose-fill)
01/V06	HH-I-515 (para. 4.8.9 in D version, Amendment 1)	Starch; Cellulosic fiber (loose-fill)
03/F01	ASTM E84	Surface flammability (Carpet)
03/F04	ASTM E648	Radiant Panel (Carpet)

Alphabetical Listing of Accredited Laboratories

The Alphabetical Listing of Accredited Laboratories with LAP(s) under which one or more test methods have been accredited (updated through September, 1982).

KEY:
(1) INSULATION LAP
(2) CONCRETE LAP
(3) CARPET LAP

(2) Aguirre Engineers, Inc.
Attn: Harmon Reynolds
14 Inverness Dr. E, Unit 8H
Englewood, CO 80112
(303) 771-4446

(2) American Admixtures and Chemicals Corp.
Attn: Michael Pistilli
5909 N. Rogers Ave.
Chicago, IL 60646
(312) 286-3737

(3) American Carpet Laboratories, Inc.
Attn: Michael D. Connell
P.O. Box 357
111 W. Nashville St.
Ringgold, GA 30736
(404) 935-5672

(2) American Testing Laboratories, Inc.
Attn: John S. Kassees
784 Flory Mill Rd.
Box 4014
Lancaster, PA 17604
(717) 569-0488

(2) Arizona Sand and Rock Company
Attn: Roy Stegall
1801 E. University Dr.
P.O. Box 20067
Phoenix, AZ 85036
(602) 254-8465

(3) Armstrong World Industries, Inc.
Marietta Carpet Plant
Attn: John H. Cooper
Route 441
Marietta, PA 17547
(717) 653-2031

(2) The Arundel Corporation
Greenspring Laboratory
Attn: John M. Glowacki
6806 Greenspring Ave.
Baltimore, MD 21209
(301) 296-6400

(3) Associated Testing Laboratories
Attn: George J. Murphy
23 Vincent St.
Wayne, NJ 07470
(201) 628-1363

(2) Atlantic Testing Laboratories, Ltd.
Cicero Division
Attn: Spencer Thew
P.O. Box 28
Canton, NY 13617
(315) 699-5281

(3) Bigelow-Sanford, Inc.
Georgia Rug Mill
Attn: Van A. Pullen
Lyerly St.
Summerville, GA 30747
(404) 857-2421

(3) Bigelow-Sanford, Inc.
Greenville, SC
Attn: Hamir D. Merchant
Technical Services
P.O. Box 3089
Greenville, SC 29602
(803) 299-2630

(2) Bowser-Morner Testing Labs, Inc.
Dayton, Ohio Laboratory
Attn: Judith A. Castello
420 Davis Ave.
P.O. Box 51
Dayton, OH 45401
(513) 253-8805

(2) Bowser-Morner Testing Labs, Inc.
Maysville, Kentucky Laboratory
Attn: William Montgomery
Mary Ingles Way
Route 8 West
P.O. Box 636
Maysville, KY 41056
(606) 564-6711

(2) Bowser-Morner Testing Labs, Inc.
Toledo, Ohio Laboratory
Attn: Richard Hoppenjans
122 South St. Clair St.
P.O. Box 838
Toledo, OH 43696
(419) 255-8200

(1) Butler Manufacturing Company
Research Center
Attn: Marvin K. Snyder
135th St. and Botts Rd.
Grandview, MO 64030
(816) 763-3022

(3) C.H. Masland and Sons
Attn: Roxanne L. Jacques
P.O. Box 40
Carlisle, PA 17013
(717) 249-1366

(2) Capitol Cement
Attn: Thomas L. Vick
P.O. Drawer 33240
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History of Development of Extinguishing Systems

1723 The first automatic fire extinguisher of record patented in England by Ambrose Godfrey, a celebrated chemist. It consisted of a cask of fire-extinguishing liquid containing a pewter chamber of gunpowder. This was connected with a system of fuses which were ignited, exploding the gunpowder and scattering the solution.

1806 First automatic device using water through a system of pipes invented by John Carey. It consisted of a number of rose or perforated sprinklers connected to pipes supplied with water from an elevated tank. There was a valve in the main pipe normally closed but connected to a system of cords and weights in such a manner that if the cord were burned, the valve would be opened by a counterweight.

1809 Sir William Congreve, a hydraulic engineer and member of Parliament, patented a sprinkler system consisting of rose sprinklers with combustible cords. These cords led to valves in a place of "outside security and arrangements for a further supply of water by water mains or hose connections to fire engines." In 1812, he substituted for burning cords a cement fusible at 110°F or less. The patent described an automatic sprinkler as "an apparatus for extinguishing fires which shall be called into action by the fire itself at its first breaking out and which shall be brought to bear upon the precise part where the flames exist." This patent included an alarm attachment operated by the dropping of a weight.

1852 William Macbay patented a device which resembled the automatic sprinkler. It consisted of a system of piping having outlets closed by caps of fusible metal, gutta percha or other substances that would melt at a low temperature.

1852 First perforated pipe water extinguishing system in US installed in a textile mill in Lowell, MA. It protected roofs of the mill buildings only. Idea imported from England.

1860 The Francis System of perforated pipe developed by James B. Francis. Piping was placed close to ceiling, running across the mill on the center of each bay. Pipe perforated with holes 1/10 inch in diameter, placed 9 inches apart alternately on different sides and at a point a little above the horizontal center of the pipe. This caused the water to be discharged toward the ceiling at an angle which would wet the ceiling to advantage as well as properly cover the floor below.

1861 One of the first attempts to prevent freezing in a sprinkler system made by Osmund Williams when he patented a nonfreezing chemical solution to be used in sprinkler pipes. The Harkness system also used a similar solution.

1864 The first automatic sprinkler head, as the term is used today, invented by Major A. Stewart Harrison of the First Engineer London Volunteers. This device was never patented and was apparently never put upon the market. The head consisted of a hollow brass casting shaped like a flattened sphere with an internal diameter of 3 inches. This contained a large number of countersunk holes. At the upper end, the head contracted into a cylinder 1 inch in diameter threaded on the outside so that it could be screwed into a pipe. Inside of this was a valve in the form of a cup-shaped piece of soft rubber which when closed held back the water. The inside of the head at this point was tinned to prevent the rubber from sticking to the brass. Since the valve was of rubber and cup-shaped, the water tended to make the joint tighter as the pressure increased. The valve was held in place by a spindle which extended down through the head and through a wooden projection on the under side, to a shoulder at the lower extremity. Here it was held by low-fusing solder under compression. The wooden projection was put on, in order to insulate the solder joint from the brass casting and make the head more sensitive to heat. When the solder fused, the spindle and valve were pushed down by the water pressure and the water was discharged through the perforations.

1864 Another dry sprinkler system made by William Gilbert, Edwin Cooper and G.R. Webster used a fusible cord of gutta percha, chloride of sulphur, sulphuret of antimony, copper bronze and naphtha. This melted at from 90° to 120°F and was arranged so that when it fused it would release the hammer of an alarm and also open the water valve on a sprinkler supply pipe.

1870 Francis System of perforated pipe generally extended to cover picker, card and spinning rooms as well as other hazardous areas. Like other perforated pipe systems, the system was nonautomatic; a water control valve was manually operated to fill the perforated pipe and discharge water.

1872 The first patent upon an automatic sprinkler system in this country taken out by Philip W. Pratt of Abington, MA. This device consisted of two revolving hollow arms containing perforations. These arms were attached to a pipe containing water under pressure and there was a valve just above the connection ordinarily kept closed. There was a system of cords and fuses attached to the valve in such a way that when any fuse melted, the valve was opened.

1872 John Souther of Boston, MA advocated an automatic fire extinguisher consisting of perforated brass steam pipes. Steam was turned on automatically by the expansion of the pipe or by the burning of cords. A steam whistle was sounded at the same time.

1873 J.C. Meehan of Springfield, MA, patented an automatic steam sprinkler operated by fuses running to a small cylinder of gunpowder. When this exploded, a valve was opened.

1873 Buell sprinkler invented. This was probably the first head of the sensitive type to be put into practical use. It was also the first head to use the modern principle of distributing water coming through an open outlet by means of a splash plate or deflector.

1874 Henry S. Parmelee of New Haven, CT, invented the first automatic sprinkler head to be used extensively in practice. It is said that Parmelee objected to the high rates of insurance charged for his piano factory after the Chicago and Boston conflagrations. He was determined to find some form of protection that would warrant a reduction in rate.

Parmelee took out his first patent in August, 1874. This covered a device which consisted of a perforated head containing a valve that was held closed against water pressure by a heavy spring.

The sprinkler system in the Parmelee Piano Factory in New Haven was used for heating in extremely cold weather. There was an auxiliary system of steam pipes of sufficient capacity to heat the building in moderate weather, but in very cold weather, steam was let into the sprinkler pipes. The sprinkler heads were placed upon inverted U pipes to form a trap which would remain full of water and thus keep the steam from heating the heads unduly. The Parmelee system of piping, being a "tree" system, was especially adapted for this purpose. The heat that circulated in the main feed pipes would not cause much circulation in the branch pipes in which the sprinklers were located.

1875 Parmelee developed an entirely new type of sprinkler in which a brass cap was soldered over a distributor. This was one of the simplest sprinklers ever made but was not as sensitive as the previous type because water rested against the inside of the solder joint. This head was designed to screw onto a nipple and was threaded on the inside.

1878 The Parmelee sprinkler was further modified by substituting a rotating slotted turbine for the perforated distributor, thus improving the distribution, and giving less chance for clogging by sediment. The same year, the head was redesigned by Grinnell and made more sensitive by hollowing out the base so that much less of the solder joint was in contact with the water in the pipes. It was also threaded on the outside to fit a ½-inch pipe fitting.

These heads were screwed into the upper side of pipes suspended from the ceiling and spaced about 10 feet apart in each direction. When the head and the piping became heated to the fusing point of the solder (about 160°F), the pressure would force the cap off from the head and water would be distributed by the revolving turbine.

The method of piping originated by Parmelee and used for many years in his systems was the so-called "tree" system. The main feed pipes were placed about 20 feet apart and the branch lines were of ¾-inch pipe 5 feet long spaced about 10 feet apart on the feed pipe. This brought the heads about 10 feet apart in each direction.

The Parmelee system also contemplated an alarm valve which would operate a bell or a whistle in case one or more sprinklers opened. This consisted of a flapper check valve placed in the main riser near its base. A lever connected with the hinged end of the check extended through a stuffing box and was connected by a wire to a steam whistle or to a mechanical gong. When the check valve was lifted by the flowage of water, the steam whistle or the gong was put into operation.

1878 The Parmelee system first installed by the piping firm of Foskett, Bishop & Co., of New Haven, CT. The first regular installation, outside of an experimental one in the plant of the Parmelee Piano Works, was in the risk of M. Seward & Son, New Haven, CT. Later, Parmelee made arrangements with the Providence Steam & Gas Pipe Company for installing this system. This marked the formalization of the first pipe schedule systems. This company continued to install these heads until about 1882 when Frederick Grinnell invented an improved type of sprinkler which bears his name.

Some 200,000 Parmelee heads were installed, mostly in mills located in New England. The Parmelee catalog for 1881 gives a list of 214 plants equipped with the device. Of these, 140 were in New England. This catalog also gives a list of 19 fires successfully controlled by these heads between 1877 and 1881.

1879 John W. Bishop of New Haven, CT suggested a dry-pipe valve in 1879 and took out patents in 1881. This consisted of a vertically rising valve closing the water port. A stem on the upper side of the valve was clamped to an elastic diaphragm of a much larger area than the water valve. Water was allowed to enter the system above the diaphragm to a sufficient height to hold the valve closed by pressing on the upper side of the diaphragm. There was a by-pass containing a cock normally closed, extending from below the water valve to the space under the diaphragm.

A system of cords containing fusible links at short intervals was strung along the ceiling near the sprinklers and so arranged that when any link melted, a weighted lever connected to the cock was released. This opened the cock in the by-pass and allowed water pressure to enter the space under the diaphragm. This counteracted the pressure above the diaphragm and allowed the water pressure in the main pipe to open the water valve.

1879 Frederick Grinnell of Providence, RI took out his first patent on a dry valve. This consisted of a horizontal check valve seating vertically and with a stem running in guides. A system of levers was used to hold this valve securely closed. A small diaphragm in the lower part of the casting acted on a rod which was arranged to trip the levers. Air pressure pumped into the pipes above the check valve held this diaphragm down. When the air pressure was released, the diaphragm, actuated by a weighted lever or spring, was forced up and this motion tripped the levers and allowed the valve to open. This valve was self-contained, except for an alarm attachment.

1881 J.C. Meloon of Providence, RI patented an alarm valve of the vertical check type. The movement of the clapper operated an auxiliary valve which admitted water from below the check valve to a chamber. The water pressure in the chamber actuated a diaphragm which, when it moved, tripped the catch of a mechanical alarm.

1882 Frederick Grinnell took out a vast number of patents covering perforated pipes, sprinkler heads, deflectors, solder joints and many other details. Under his control, the Providence Steam & Gas Pipe Co., later the General Fire Extinguisher Co., became the leading sprinkler company in the country. Frederick Grinnell should be given the credit for doing more than any other one man to develop the art of sprinkler protection.

In 1882, he invented a sprinkler which was a radical departure from anything that had been made up to that time. Instead of a nozzle, he used a plate orifice. The valve and deflector were in one piece, the center of the deflector being depressed and filled with a disc of lead to form the valve. The deflector itself had teeth projecting at right angles around the edge to distribute the water. The valve was held in place by a pair of compound levers.

The Grinnell head soon became the standard sprinkler of the country and was very extensively used.

1884 Charles Buell patented a valve of the packed stem type in which the lever attached to a swing check started a train of clockwork actuated by a weight. This rang a mechanical gong. The Walworth Manufacturing Co. also made some valves of this general type.

1884 C. Woodbury, of the Boston Manufacturers Mutual Fire Insurance Co., and F. Cabot, of the Boston Board of Fire Underwriters, published their study of the performance of sprinklers. They set the scene for the development of sprinkler system installation rules.

1885 The first decade of the history of automatic sprinklers may be said to have ended in 1885. It was a period of prolific invention in which many heads of widely different types were thoroughly tested by field experience. The more important of these types were as follows:

- Heads depending upon the burning of cords.
- Rose heads of the sealed or water-joint type.
- Rose sprinklers with valves.
- Sealed type with turbine or slot distribution.
- Valve sprinklers with deflectors and operating by the fusing of solder.

1885 The first dry-pipe valve to be generally used was the Grinnell differential "bellows type" invented in 1885. The differential valve No. 12 which succeeded it in 1890 was very widely used.

1885 John Wormald, of the Mutual Fire Insurance Corporation of Manchester, England, wrote the first pamphlet of rules for automatic sprinklers.

1886 The developments which followed those in 1885 were more along the lines of perfecting old types rather than creating new ones. After 1885, there were practically no sprinklers made except valve sprinklers with deflectors. The development after this date consisted largely of improvements in the sub-types under this general heading. However, one rather distinct sub-type was created, namely, the valve held closed by a strut composed of several pieces of metal held together by low-fusing solder.

1887 Sprinkler system installation rules prepared by the Factory Improvement Committee of the New England Fire Insurance Exchange. Other insurance boards and bureaus also wrote rules about that time.

1895 In the Boston area alone, nine different standards for the size of pipe and for sprinkler spacing were in use by insurance organizations. At an informal meeting of representatives of inspection bureaus in New York in December 1895, a committee was named to formulate rules governing automatic sprinkler installations.

1896 At a second meeting of the representatives of the inspection bureaus, the recommendations of that committee were generally adopted by insurance inspection departments throughout the country. At the second meeting, a committee was appointed to present a plan for a permanent organization, which it did at a meeting in New York on Nov. 6, 1896. At that meeting, the NFPA was organized, with 20 insurance boards and bureaus as members.

The NFPA had rules for the installation of automatic sprinkler systems as its one and only standard at the time of its origin in 1896. The 1896 pipe schedule, known as the 1, 2, 4 schedule, allowed one sprinkler on ¾-inch pipe, two on 1-inch, four on 1 ¼-inch, etc.

1897 The NFPA Committee on Automatic Sprinklers consisted of five people. They represented the New York Board of Fire Underwriters, the Southeastern Tariff Association, the Factory Insurance Association and the Western FIA, and Underwriters' Bureau of New England.

1899 At the NFPA Annual Meeting, the President announced that, aside from the slight modifications required by local conditions, the underwriters' regulations governing the installation of sprinkler systems had been made uniform throughout the United States and Canada.

1900 The National Board of Fire Underwriters joined the NFPA and offered to adopt and publish the NFPA Standards — an offer that the NFPA accepted. Thus started the program by which from 1901 to 1964 the NFPA Standard for Installation of Sprinkler Systems was published by the National Board, first as rules and requirements, later as regulations, and still later as a standard of the National Board of Fire Underwriters as recommended by the National Fire Protection Association.

1901 Shaw developed a valve sprinkler with a toothed deflector and a frame of modern design. The actuating device which caused the parts of the strut to fall apart was a small receptacle containing alcohol or ether instead of an expansive wax. When the alcohol or ether expanded, the side of the thermostatic chamber was pressed outward and this movement threw out a key which allowed the strut to collapse.

1905 Based on fire experience that the 1896 pipe schedule was too liberal, the number of sprinklers on pipe of various sizes was decreased to what became known as the 1, 2, 3 schedule.

1906 First American District Telegraph Co. (ADT) sprinkler supervisory system marketed. Systems consisted of circuit breakers attached to check valves to give water flow alarm; gate valve attachments, pressure gages, water level attachments, temperature devices and the necessary transmitters, batteries, etc.

The purpose of the systems was to give notice at a central station in case anything happened to a sprinkler system to seriously impair its effectiveness or in case there was water flow in the pipes due to a break or to the opening of a sprinkler. The signals were transmitted to a central station through a closed circuit system of wiring and received there on a bell and tape machine. When a trouble signal was received, a runner was sent from the central station to investigate.

1910 The weave shed of a New Bedford Cotton Mill piped with a system that could be used both for sprinkler and heating purposes.

1922 First NFPA standard on foam extinguishing systems adopted. (Later became NFPA 11.)

1929 Adoption of NFPA standard on carbon dioxide fire extinguishing systems. (Later became NFPA 12.)

1930 Light hazard occupancy pipe schedule system added to the NFPA sprinkler system installation standard. Systems for extra hazard conditions were recognized as open-head systems, with use of a pipe schedule the same as for ordinary hazard occupancies.

1931 First NFPA standard on the use of inert gas for fire and explosion prevention adopted. [Later became NFPA 12A.]

1940 Sprinkler installation rules changed such that the smallest-size branch pipe was increased to 1 inch for several reasons. One reason was that 1-inch pipe would be less likely to plug up from rust and mud, as had been found in many ¾-inch lines in dry-pipe systems.

1940 First NFPA standard on water spray systems adopted. [Later became NFPA 15.]

1952 Factory Mutual developmental work on the "spray sprinkler" conducted.

1955 Former standard sprinkler designated as old type with the recognition of the new "spray sprinkler" as the standard sprinkler.

1955 Hydraulically designed sprinkler systems briefly addressed in NFPA 13.

1957 NFPA 17 on dry chemical extinguishing systems first adopted.

1962 NFPA 16 on foam water extinguishing systems first adopted.

1966 NFPA 13 expanded to include detailed rules covering hydraulically designed systems.

1970 NFPA 11A and 12A on high expansion foam systems and Halon 1301 systems, respectively, first adopted.

1972 NFPA 12B on Halon 1211 systems first adopted.

1973 NFPA 11B on synthetic foam and combined agent systems first adopted.

1973 Grinnell ON-OFF sprinkler listed and marketed.

1975 NFPA 13D on residential sprinkler systems using standard commercial sprinklers adopted.

1980 Viking large-drop sprinkler listed and marketed.

1980 NFPA 13D residential sprinkler system installation standard revised to require exclusive use of new "residential sprinkler."

1981 Grinnell residential sprinkler listed and marketed.

Significant Technological Developments Since 1978

Introduction

The purpose of this section of the *Almanac* is to highlight significant developments in fire protection technology during the last five years. The list has been limited to developments which have reached a stage of successful field application. There are perhaps other developments which have not been included here. It is hoped this section will expand as new editions of the *Almanac* are published, as it has not been the intent to knowingly exclude any notable achievements.

Residential Sprinklers

In 1973, the NFPA Committee on Automatic Sprinklers appointed a Subcommittee to prepare a residential sprinkler standard. In 1975, the first standard on the *Installation of Sprinkler Systems in One- and Two-Family Dwellings and Mobile Homes*, NFPA 13D was adopted, utilizing existing automatic sprinkler head technology. Actual installations based on this standard have been rare, however, primarily due to cost.

Beginning in 1976, the National Fire Prevention & Control Administration (later renamed the U.S. Fire Administration) funded a number of research programs to evaluate the residential fire problem in depth and determine the "what" and "how" of accomplishing a satisfactory solution. The NFPCA/USFA programs included studies to assess the probable impact of using sprinklers to reduce the incidence of deaths and injuries in residential fires. Other studies evaluated the design, installation, practical usage, and user acceptance factors that would impact on accomplishing reliable and acceptable installed systems; studies to evaluate minimum water discharge rates, automatic sprinkler flow and response sensitivity design criteria; and full-scale tests to test prototype systems.

In addition to spurring the development of new technology, the recent research also provided much of the basis for a complete revision to the 1975 edition of NFPA 13D. This revision was adopted in the fall of 1980 and, among other performance criteria, requires that only listed residential sprinklers shall be used.

In 1981, a breakthrough in sprinkler head technology was achieved by Grinnell Fire Protection Systems, Inc. A new, more sensitive sprinkler head, which activates five times faster than conventional heads, was listed by Underwriters Laboratories for residential use in accordance with NFPA 13D (1980). In addition to faster activation, the new technology offers an improved distribution pattern which cools adjacent air near other sprinklers, thus reducing the possibility of more than two heads activating. This assures an adequate rate of flow available to supply two heads. The new heads perform satisfactorily with a flow rate as low as 18 gpm for one sprinkler operating, and 13 gpm for two sprinklers operating (total flow of 26 gpm) at operating pressures below 40 psi.

As a result of this development, and in conjunction with low-cost piping, an entire residential sprinkler system is hopefully affordable to the average homeowner by keeping costs about one percent of the cost of a new home. Research is continuing, and a residential sidewall sprinkler which could reduce residential sprinkler costs further, particularly in retrofit installations, is now available.

Future developments addressing the need for even greater sensitivity appear to be imminent. One concept involves the development of an "on-off" type of sprinkler head for residential applications, while another involves the use of electronics to trigger sprinkler activation upon reaching a temperature or rate-of-rise threshold.

Although the greatest benefit of this residential sprinkler technology will be the lives saved and injuries prevented, lower property losses will be a secondary and substantial benefit of the installation of residential sprinklers.

Residential Sprinkler Research — Important Studies to Date

- Halpin, B.M., Dinan, J.J., and Deters, O.J., *Assessment of the Potential Impact of Fire Protection Systems on Actual Fire Incidents*, John Hopkins University-Applied Physics Laboratory (JHU/APL), Laurel, MD, October 1978.

  This study describes an in-depth analysis of fires involving fatalities and includes an assessment of how use of detectors, sprinklers or remote alarms would have changed the results.

- Yurkonis, Peter, *Study to Establish the Existing Automatic Fire Suppression Technology for Use in Residential Occupancies*, Rolf Jensen and Associates, Inc./Schirmer Engineering Corporation, Deerfield, IL, December 1978.

  This study identified suppression systems and evaluated design and cost factors affecting practical usage and user acceptance.
- Kung, H., Haines, D., Green, R. Jr., *Development of Low-Cost Residential Sprinkler Protection*, Factory Mutual Research Corporation (FMRC), Norwood, MA, February 1978.

  This study is aimed primarily at development of low-cost residential sprinkler systems having minimal water discharge rates providing adequate life and property protection from smoldering fires.
- Henderson, N.C., Riegel, P.S., Patton, R.M., Larcomb, D.B., *Investigation of Low-Cost Residential Sprinkler Systems*, Battelle Columbus Laboratories (BCL), Columbus, OH, June 1978.

  Fire tests of commercial nozzles and evaluation of piping methods to achieve low-cost systems based on propane burner, wood crib and furniture fire tests.
- Clarke, Graham, *Performance Specifications for Low-Cost Residential Sprinkler System*, Factory Mutual Research Corporation, Norwood, MA, January 1978.

  A review of data from the listed USFA research efforts as a basis to prepare a proposed standard to install residential sprinkler systems and test residential sprinklers.
- Kung, H.C., Spaulding, R.D., Hill, E.E. Jr., *Sprinkler Performance in Residential Fire Tests*, Factory Mutual Research Corporation, Norwood, MA, July 1980.

  Fire tests on representative living room and bedroom residential configuration with combinations of furnishings and with open and closed windows and with variations in sprinkler application rates and response sensitivity of sprinklers. This work has been closely evaluated by the NFPA 13D Subcommittee during its conduct, and the Subcommittee was responsible for directing many of the test conditions which were evaluated.
- Cote, A., Moore, D., *Field Test and Evaluation of Residential Sprinkler Systems*, Los Angeles Test Series, National Fire Protection Association, Boston, MA, April 1980. (A report for the NFPA 13D Subcommittee).

  A series of fire tests in actual dwellings with sprinkler systems installed in accordance with the data resulting from all prior test work and the criteria included in the proposed 1980 revisions to NFPA 13D so as to evaluate the effectiveness of the system under conditions approaching actual use.
- Moore, D., *Data Summary of the North Carolina Test Series of USFA Grant 79027 Field Test and Evaluation of Residential Sprinkler Systems*. National Fire Protection Association, Boston, MA, September 1980. (A report for the NFPA 13D Subcommittee).

  A series of fire tests in actual mobile homes with sprinkler systems installed in accordance with the data resulting from prior test work and following criteria described in NFPA 13D-1980 in order to evaluate the effectiveness of the system under conditions approaching actual use.
- Kung, H.C., Spaulding, R.D., Hill, E.E. Jr., Symonds, A.P., *Technical Report, Field Evaluation of Residential Prototype Sprinkler, Los Angeles Fire Test Program*, Factory Mutual Research Corporation, Norwood, MA, February 1982.
- Cote, A.E., *Final Report on Field Test and Evaluation of Residential Sprinkler Systems*, National Fire Protection Association, Quincy, MA, July 1982.
- Factory Mutual Research Corporation/Underwriters Laboratories, Inc., *Standard for Residential Automatic Sprinklers for Fire Protection Service*, Northbrook, IL, April 1980.

  A study to develop a performance standard for testing residential sprinklers under room fire conditions that are in harmony with the requirements of NFPA 13D.

- Underwriters Laboratories, Inc., *Proposed Standard for Residential Automatic Sprinklers for Fire Protection Service*, UL-1626, Northbrook, IL, October 1980.

This standard describes the requirements for the testing of residential sprinklers by a testing laboratory.

Residential Remote Alarm Systems

Utilizing the burgeoning cable television industry systems, a new conceptual design for residential firesafety was recently announced, called The Automatic Remote Residential Fire Alarm System (ARRAS). While providing subscribers with cable TV programming, ARRAS is also capable of engaging an alarm to request aid from emergency facilities. The alarm can be transmitted directly to the emergency organization or a central monitoring station which would forward the emergency requests to police, fire, or medical services.

There has been some research completed in relation to these developments. In May 1980, a report was released by the U.S. Fire Administration relative to a remote detection/alarm system utilized in the planned community "The Woodlands" near Houston, TX. The objective of this study was to analyze the alarm history of a community protected by a remote detection/alarm system and evaluate the effectiveness in reducing fire losses.

A brief analysis of the report indicates a possible trend of lesser fire losses in homes equipped with the system. However, this is based on a limited number of incidences. One encouraging fact reveals there were no "large loss" fires (over $10,000) in homes equipped with an alarm system, whereas 4 such fires occurred in the community during the period of the study (10/1/75 - 9/30/78) in homes not so equipped.

One difficulty realized in "The Woodlands" system analysis was unnecessary activations. Cooking, system mechanical problems, and fireplaces accounted for the majority of these false activations. One important conclusion was that further research is necessary, including verification of the trends noted in "The Woodlands" study.

Another report prepared for the U.S. Fire Administration titled *Initial Report, A National Directory of Automatic Detection/Suppression and Remote Alarm Systems* was released in August 1980. The objective of this report was to develop a national directory for extent and type of automatic detection, suppression and remote alarm systems. The report points out that as economic constraints increase, many communities are still faced with growth rates which demand additional fire protection capability. Without the funding to support actual in-place apparatus, fire fighting and inspection personnel, one choice is more balance between these services and built-in protection — such as remote detection and alarm systems.

Although much of the report is directed at detection and suppression facilities, the report has indicated that the relatively new transmission capabilities of cable television facilities are fast growing. The survey reveals 19 existing cable alarm services and 16 more in the planning stage. The number of actual subscribers to these services is difficult to determine, and the survey points out (as did the previous report cited above) that false alarms are one of the early problems experienced.

The following is a list of the existing or planned cable systems that provide emergency alarm service.

Alabama
Red Bay TV Cable
Box 446
Red Bay 35582
(205) 356-1241
Burglar Alarm and Police Surveillance
875 subscribers as of 1978

Alaska
M_2P.D.C. Inc.
Star Route 50410
Fairbanks 99701
(907) 372-4169
Fire, Burglar Alarm, Police Surveillance
1,200 subscribers as of 1978

B.C. Cable Co., Inc.
Box 929
Juneau 99802
(907) 486-3320
Fire Alarm
4,000 subscribers as of 1978

Arizona

Arizona Cable TV Inc.
Box 4185
Scottsdale 85258
(602) 949-7852
Fire and Burglar Alarm
659 subscribers as of 1977

Arizona Cable TV Inc.
Box 13741
Phoenix 85002
(602) 257-0115
Fire and Burglar Alarm
145 subscribers as of 1977

California

Cable Service of Azusa Inc.
916 Cherrystone Dr.
Los Gatos 95030
(408) 354-1880
Fire and Burglar Alarm
number of subscribers unknown

Dickinson Communication Ltd.
18080 Beach Blvd.
Huntington Beach 92648
(714) 842-4455
Fire and Burglar Alarms, Police Surveillance
number of subscribers unknown

Florida

Computer Cable TV Inc.
1001 Roosmoor Circle
Coconut Creek 33063
(305) 971-3500
Fire Alarm, Medical Alert, Police Surveillance
448 subscribers as of 1976

(planned)
Selkirk Communications Ltd.
Ft. Lauderdale area
(305) 527-6600
Fire Alarm, Medical Alert, Police Surveillance

(planned)
PGA Communications
address unknown
Palm Beach Gardens 33480
(305) 627-1220
Fire and Burglar Alarms, Medical Alert, Police Surveillance

Georgia

City of Monroe, Water, Light and Gas Commission
215 N Broad St.
Box 725
Monroe 30655
(404) 267-3429
Fire and Burglar Alarm
1,914 subscribers as of 1978

Kansas

Progressive Communications Inc.
Box 14
Burdett
Fire and Burglar Alarms, Police Surveillance
202 subscribers as of 1978

Lendsburg Cable TV
Box 18387
Wichita 67207
(913) 227-2264
Fire and Burglar Alarms
203 subscribers as of 1977

(planned)
Smith Center Cable TV
Box 18387
Wichita 67207
Fire and Burglar Alarms

Maryland

St. Charles CATV Inc.
St. Charles Communications
336 Post Office Rd.
Waldorf 20601
(301) 843-8600
Fire and Burglar Alarms, Medical Alert
1,850 subscribers as of 1978

Massachusetts

(planned)
Colonial Cablevision of Revere, Inc.
334 Broadway
Revere 02151
(617) 289-2288
Fire Alarm

New Hampshire

United Cable Co. of New Hampshire
Box 658

36 Hanover St.
Manchester 03104
(603) 669-2115
Fire and Burglar Alarms, Police Surveillance
13,715 subscribers as of 1978

New York
Rensselaer County Cablevision Corp.
Box 439
212 Broadway
Rensselaer 12144
(518) 283-6200
Fire Alarm, Emergency Alert
4,205 subscribers as of 1978

North Carolina
Cablevision of Salisbury Inc.
136 N Green St.
Box 1658
Salisbury 28144
(704) 633-5484
Police Surveillance
2,321 subscribers as of 1978

Ohio
(planned)
Warner Cable of Columbus
Box 14468
4284 N. High
Columbus 43214
(614) 261-0001
Fire and Burglar Alarms, Medical Alert

(planned)
Veacom Cablevision of Dayton
275 Leo St.
Dayton 45404
(513) 223-8472)
Fire and Burglar Alarms, Medical Alert

Tel Vu Systems Inc.
13765 N. Main St.
Weston 43569
Burglar Alarm and Police Surveillance
150 subscribers as of 1975

Oregon
(planned)
C.B. Schrock & Associates Inc.
2040 S.W. 187th St.
Aloha 97005
(503) 649-2718
Fire, Medical and Police Security

Pennsylvania
(planned)
Block Mountain Telecable Inc.
47 Main St.
Dallas 15612
(717) 675-1171
Fire and Burglar Alarms, Police Surveillance

South Carolina
Cencom Inc.
Box 21368
Columbia 29221
(803) 772-4020
Fire and Burglar Alarms
75 subscribers as of 1977

Texas
(planned)
GRB Communications Inc.
Route 4
6537 S. Stemmons
Denton 76201
(817) 497-4055
Fire and Burglar Alarms, Police Surveillance

Wisconsin
(planned)
Northern Lights Cable Corp.
Box 224
Presque Isle 54557
(715) 686-2938
Fire and Burglar Alarms

RVS Cablevision Corp.
2767 Mayfair Rd.
Wauwatosa 53226
(414) 259-1234
Fire and Burglar Alarms, Police Surveillance

For further information see: 1) "Remote Detection and Alarm for Residences: The Woodlands System," prepared by the Federal Emergency Management Agency/U.S. Fire Administration, May 1980; and 2) David B. Gratz and Raymond E. Hawkins, *Initial Report, A National Directory of Automatic Detection/Suppression and Remote Alarm Systems,* prepared for the Federal Emergency Management Agency/U.S. Fire Administration, August 1980.

Large Drop Sprinkler

As early as 1968, the Factory Mutual Research Corporation (FM) has been expanding its program for improved sprinkler technology. This program is referred to as the "Sprinkler Optimization Program." The development of the quick response residential sprinkler was partially developed through this program. An additional sprinkler technology which has recently come to the forefront is the idea of the "large drop" sprinkler.

The desire to provide better automatic sprinkler protection for the very "high challenge" fire served as the motivation for the research and development of this concept. The high challenge fire produces gases of high temperature very rapidly, resulting in high velocity fire plumes and high rates of heat release. The initial theory was to produce a high proportion of "large drops" which could be effective in forcing their way through the high velocity plume, thus reaching the surface of the burning fuel — to affect extinguishment.

With this in mind, the most important characteristic of the new heads was the penetration — considered as the "limit density of GPM per sq. ft." This is the actual density of water delivered to the base of the fire.

The sprinkler promoted by FM has an orifice size of .64 in. diameter with other modifications. The installation of this sprinkler is intended to be controlled by the use of specific guidelines from FM, not by application of NFPA 13. According to FM, this is because the density/area concept (per NFPA 13) is meaningless with use of the large drop sprinkler. FM guidelines use a "pressure spacing" base.

The FM guidelines for application of this technology are available to the public. An interesting result of the many tests conducted by FM is that it was found that an increase in pressure would increase "penetration" and decrease the number of sprinklers operated. This results in lower water demand, lower ceiling temperatures, and less fire damage. The FM guide recommends a minimum pressure of 25 psi.

The spacing, pressure, and distribution patterns are also very important — perhaps as much so as the drop size itself. FM emphasizes that design of systems using this sprinkler technology must be as per the FM guidelines and based on individual conditions analyzed on a case-by-case basis. FM points out that use of this type sprinkler using NFPA 13 standards may result in total failure of the resulting system.

Electronics

Modern electronic advances and computer technology has progressed rapidly, and with the extremely small components and mass production capabilities combined, more and more applications are becoming evident at lower and lower costs. As an example, sophisticated smoke detectors of both the photoelectric and ionization types are readily available on the shelves of department stores, and with a price tag of $10-$15 are affordable by most American households.

Further applications have been developed or refined, particularly within the fire service. Some notable applications include pocket-size personal alert devices (P.A.D.s) and computer-aided dispatch systems (C.A.D.S.).

Solid state technology has considerably reduced the size of equipment. In addition, systems are becoming modular in design so that flexibility in choosing various functions and performance levels is enhanced. The greatly increased data storage capacity of most systems is very useful to fire service facilities throughout the country.

Another advantage of more recent developments is the availability of less expensive, smaller rechargeable batteries to provide standby emergency power. The newer systems have much lower power demands, thus lessening the need for large standby power installations.

The most dramatic advances in fire alarm technology have been associated with emergency voice communications. This is due largely to the need for orderly movement of occupants in high-rise structures. Pre-recorded voice instructions can be provided upon actuation of the central control unit, although fire department personnel can override these announcements with live broadcasts when necessary.

Fire Protection Standards

Organizations and Agencies that Develop Standards or Regulations Related to Firesafety

The following list contains the names of 50 U.S. and foreign organizations that develop fire protection or fire protection-related standards or regulations. Included are U.S. voluntary organizations, U.S. government agencies, and foreign voluntary organizations.

U.S. VOLUNTARY STANDARDS-MAKING ORGANIZATIONS

Name	Description	Founding Date	Number of Members	Number of Staff	Meetings
American Association of Textile Chemists and Colorists (AATCC) P.O. Box 12215 Research Triangle Park, NC 27709 (919) 549-8141 William R. Martin, Jr. Exec. Dir.	A technical and scientific society which maintains 60 research committees and is recognized as an authority for the development of standard test methods for flammability of clothing textiles.	1921	8,000	21	annual
American Concrete Institute (ACI) P.O. Box 19150, Redford Station Detroit, MI 48219 (313) 532-2600 George F. Leyh, Exec. Dir.	A technical society for those interested in improving design construction and maintenance of concrete products and structures. Sponsors 124 technical committees made up of architects, engineers, educators, and other interested groups.	1905	16,000	45	semi-annual (spring and fall)

Name	Description	Founding Date	Number of Members	Number of Staff	Meetings	Serves on NFPA Committee	NFPA Serves on Its Committee
American Gas Assn. (AGA) 1515 Wilson Blvd. Arlington, VA 22209 (703) 841-8400 George H. Lawrence, Pres.	Provides information on safety of all phases of gas transmission and distribution. Promotes employee and public safety. Maintains an independent committee that compiles standards on construction and performance of appliances and equipment as well as special committees in the area of gas industry interest. Cosponsor with the NFPA of American National Standard ANSI Z223.1-1980, *National Fuel Gas Code.*	1918	4,800	420	annual (October)	X	
American Insurance Assn. (AIA) 85 John St. New York, NY 10038 (212) 699-0400 T. Lawrence Jones, Pres.	Membership represents companies providing property and liability insurance and suretyship. Maintains standing committees with varied interests including fire prevention. Publishes information on fire prevention as well as suggested codes and ordinances.	1964	147	323	annual (May)	X	
American National Standards Institute (ANSI) 1430 Broadway New York, NY 10018 (212) 354-3300	Serves as a clearinghouse for nationally coordinated voluntary safety, engineering, and industrial standards. Gives status as	1918	1,025	115	annual	X	X

Donald L. Peyton, Exec. V. Pres.	American National Standards to standards developed by agreement from all groups concerned. Represents U.S. interests in international standardization work.					
American Nuclear Society (ANS) 555 N. Kensington Ave. LaGrange Park, IL 60525 (312) 352-6611 Octave J. DuTemple, Exec. Dir.	Membership includes professionals with experience in nuclear science or nuclear engineering. Society maintains various standards committees, including those dealing with nuclear reactor safety, radiation protection and shielding, and thermal hydraulics	1954	13,000	85	semi-annual (spring and fall)	X
American Petroleum Institute (API) 2101 L St., NW Washington, DC 20037 (202) 457-7000 Charles J. DiBona, Pres.	Membership includes producers, refiners, marketers, and transporters of petroleum products. Publishes safety codes and standards on fire protection for the petroleum industry.	1919	7,500	500	annual (November)	X
American Society of Heating Refrigerating and Air-Conditioning Engineers (ASHRAE) 1791 Tullie Circle, NE Atlanta, GA 30329 (404) 636-8400 A.T. Boggs, Exec. V. Pres.	Professional society of heating, refrigeration, air-conditioning, and ventilating engineers. Sponsors 88 technical committees and publishes standards on various aspects of air-conditioning, heating, and refrigeration systems.	1894	45,000	75	annual (June)	X

Name	Description	Founding Date	Number of Members	Number of Staff	Meetings	Serves on NFPA Committee	NFPA Serves on Its Committee
ASTM formerly: American Society for Testing and Materials (ASTM) 1916 Race St. Philadelphia, PA 19103 (215) 299-5400 William T. Cavanaugh, Pres.	Publishes standard fire tests of building construction and materials; combustibility and surface flammability of various building construction assemblies; and, recommends practices for preparation of fire test standards. Sponsors 138 technical committees and develops voluntary consensus standards for materials, products, systems, and services.	1898	31,000	200	monthly	X	X
American Society of Mechanical Engineers (ASME) 345 E. 47th St. New York, NY 10017 (212) 644-7722 Dr. Burke E. Nelson, Exec. Dir.	Technical society of mechanical engineers. Develops the *Boiler and Pressure Vessel Code,* power test codes, and other safety codes and standards for equipment.	1880	104,000	250	semi-annual (June and November)	X	X
American Water Works Assn. (AWWA) 6666 Quincy Ave. Denver, CO 80235 (303) 794-7711 David B. Preston, Exec. Dir.	Membership composed of individuals interested in public water supply. Develops standards for fire hydrants, piping systems, valve-types, and other water installation systems.	1881	34,000	70	annual (June)	X	X

American Welding Society (AWS) 2501 NW, 7th St. Miami, FL 33125 (305) 642-7090 Perry Rippolo, Exec. Dir.	Professional engineering society in the field of welding. Sponsors approximately 100 technical committees. Publishes codes, standards, specifications, and handbooks on welding.	1919	35,000	70	annual (April)	X	
Building Officials and Code Administrators International (BOCA) 17926 S. Halsted St. Homewood, IL 60430 (312) 799-2300 Clarence R. Bechtel, Exec. Dir.	Promotes establishment of minimum building codes and develops and publishes Basic Building, Fire Prevention, Energy Conservation, Industrialized Dwelling, Mechanical, Plumbing, and Property Maintenance Codes. Maintains committees relating to development of the above codes.	1915	5,000	35	annual (June)	X	X
Compressed Gas Assn. (CGA) 1235 Jefferson Davis Hwy. Arlington, VA 22202 (703) 979-0900 Bernhard K. Kuehn, Pres.	Trade association which recommends improved safety standards for methods of handling, transporting, and storing gases. Acts as an advisor to authorities concerned with the regulation of safe handling of compressed gases; and collaborates with national standards organizations to develop specifications and standards for safety.	1913	300	?	annual (January)	X	
Council of American Building Officials (CABO) 507 Three Skyline Pl. 5201 Leesburg Pike Falls Church, VA 22041 (703) 931-4533 Richard P. Kuchnicki, Exec. Dir.	Membership composed of the 3 model code groups' membership. Publishes the One- and Two-Family Dwelling Code and develops, recommends and promotes uniform regulations and adoption of model codes.	1972	8,000	4	annual	X	X

Name	Description	Founding Date	Number of Members	Number of Staff	Meetings	Serves on NFPA Committee	NFPA Serves on Its Committee
Fire Equipment Manufacturers Association (FEMA) c/o Thomas Associates, Inc. 1230 Keith Building Cleveland, OH 44115 (216) 241-7333 John H. Addington, Exec. Dir.	Manufacturers of devices that detect, control or extinguish fires. Assists in promulgating standards and maintains committees dealing with firesafety.	1925	32	5	annual	X	
Institute of Electrical and Electronics Engineers (IEEE) 345 E. 47th St. New York, NY 10017 (212) 705-7900 Eric Hertz, Exec. Dir. and Gen. Mgr.	Engineers and scientists in electrical and electronic engineering. Publishes standards relating to these fields.	1884	220,000	350	irregular	X	X
Instrument Society of America (ISA) P.O. Box 12277 67 Alexander Dr. Research Triangle Park, NC 27709 (919) 549-8411 Glenn F. Harvey, Exec. Dir.	Organization serves to advance the knowledge of and use of instruments and controls in science and industry. Publishes standards and handbooks.	1945	30,000	60	annual (October)	X	
International Association of Fire Chiefs 1329 18th St., NW Washington, DC 20036 (202) 833-3420 Donald D. Flinn, Gen. Mgr.	Membership composed of city, state, military, and industrial fire chiefs, and others interested in fire prevention. Maintains committees on Building Codes, and Standardization of Fire Hose among others.	1873	7,200	18	annual (September)	X	

International Conference of Building Officials (ICBO) 5360 S. Workman Mill Rd. Whittier, CA 90601 (213) 699-0541 James E. Bihr, Exec. Dir.	Publishes, maintains and promotes the Uniform Building, Mechanical, Housing, Fire, Sign and other codes. Maintains a Code Development Committee.	1922	3,600	56	annual (September)	X
Lightning Protection Institute (LPI) P.O. Box 406 Harvard, IL 60033 (815) 943-7211 Marvin M. Frydenlund, Mng. Dir.	Manufacturers and installers of approved lightning protection equipment. Maintains a committee on codes and specifications relating to lightning safety.	1956	125	4	every 18 months	X
National Automatic Sprinkler and Fire Control Association (NASFCA) P.O. Box 1000 Patterson, NY 12563 (914) 241-2400 Edward J. Reilly, Pres.	Manufacturers and installers of automatic sprinkling devices. Participates in the development of model fire protection codes and fire test research.	1914	350	21	annual	X
National Board of Boiler and Pressure Vessel Inspectors 1055 Crupper Ave. Columbus, OH 43229 (614) 888-8320 S.F. Harrison, Exec. Dir.	Membership includes chief boiler inspections of states, major US cities and provinces of Canada having boiler laws. Publishes the National Board Inspection Code.	1919	52	40	annual (May)	
National Electrical Manufacturers Assn. (NEMA) 2101 L St., NW Washington, DC 20037 (202) 457-8400 Bernard H. Falk, Pres.	Membership includes manufacturers of electrical equipment. Publishes safety standards and the *Training Manual for Local Fire Protective Signalling Systems.* Participates in the development of the *National Electrical Code* and the *National Electrical Safety Codes.*	1926	550	100	annual (November)	

Name	Description	Founding Date	Number of Members	Number of Staff	Meetings	Serves on NFPA Committee	NFPA Serves on Its Committee
Society of Automotive Engineers (SAE) 400 Commonwealth Dr. Warrendale, PA 15096 (412) 776-4841 Joseph Gilbert, Exec. V. Pres.	Membership includes engineers and scientists in the field of self-propelled mechanisms. Publishes standards and handbooks.	1905	36,000	150	annual (February)	X	
Society of Fire Protection Technicians (SFPT) Delaware Technical and Community College 400 Christian A-Stanton Rd. Newark, DE 19702 (302) 368-6953 R. Larry Alfree, Pres.	Membership is composed of fire protection professionals in industry, insurance, education, government, or private practice. Helps develop uniform professional standards for fire protection technicians. Promotes adoption, enforcement and administration of firesafety and life safety regulations. Maintains a codes and standards committee.	1974	94	n/a	annual (September)		
Society of the Plastics Industry (SPI) 355 Lexington Ave. New York, NY 10017 (212) 573-9400 G.R. Munger, Pres.	Manufacturers and processors of row plastic materials and plastic products. Proposes standards for various plastics products and maintains 17 committees.	1937	1,500	75	annual	X	
Southern Building Code Congress (SBCCI) 900 Montclair Rd.	Develops, maintains, and promotes the adoption of the Standard Building, Gas,	1940	2,100	19	annual (October)	X	

Birmingham, AL 35213 (205) 591-1853 W.G. Vasvary, Exec. Dir.	Plumbing, Fire Prevention, Mechanical, and Housing Codes. Participates in the development of nationally recognized consensus standards. Maintains a code revision committee.						
Technical Association of the Pulp and Paper Industry (TAPPI) One Dunwoody Park Atlanta, GA 30338 (404) 394-6130 Philip E. Nethercut, Exec. Dir.	Engineers, Scientists, and administrators in the pulp and paper industry. Develops test methods for laboratory analyses and process control. Co-sponsor with the American Paper Institute of the American National Standards Committee on pulp, paper and paperboard.	1915	18,000	50	annual (March)		
Underwriters Laboratories, Inc. (UL) 333 Pfingsten Rd. Northbrook, IL 60062 (312) 272-8800 Jack Bono, Pres.	Published firesafety standards for electrical shock, explosion, detection and alarm, material flammability, smoke density, fire extinguishment, fire resistance of structural materials, and ignition sources.	1894	n/a	2,500	n/a	X	X

Foreign Voluntary Standards-Making Organizations

Name	Description	Founding Date	Number of Members	Number of Staff	Meetings	Serves on NFPA Committee	NFPA Serves on its Committee
International Electrotechnical Commission (IEC) 1, rue de Varembé CH–1211 Geneve 20 Switzerland (022) 34 01 50 M.C.J. Stanford, Secretary General	Promotes international standardization in the field of electrical and electronic engineering. IEC is composed of 43 national committees representing countries which comprise over 80% of the world's population and consumes over 95% of the world's electric energy. Publishes standards and other recommendations which standardizing authorities use in formulating their national standards.	1906	n/a	n/a	annual	X	X
International Standards Organization (ISO) 1, rue de Varembé Case Portale 56 CH–1211 Geneve 20 Switzerland (022) 34 12 40 Olle Sturen, Secretary General	Promotes standardization worldwide and develops and publishes International Standards. Maintains 163 technical committees. Membership is composed of one national standards body representing each member country. By March 1982, the number of member bodies was 72.	1947	88	120	triennial	X	X

Australian Fire Protection Assn. (AFPA) 40 Chetwynde St. West Melbourne, Victoria 3003 Australia Melbourne 02329 5577 D. Alexander Sandy, Exec. Dir. D.E. Smith, Tech. Dir	A nonprofit, technical and educational organization. Prepares and publishes Australian standards to promote their adoption. Standards are in the form of specifications for materials and products, codes of sound or safe practices, methods of testing, nomenclature, etc.	1922	2,000	?	annual (October or November)		
British Standards Institute (BSI) 2 Park St. London, WIA 2BS England (01) 629 9000 Dr. G.B.R. Feilden	Recognized body for the preparation of national standards in the UK. Its main function is to draw up voluntary codes and standards of good practice by agreement among all interests concerned, and to promote their adoption. Participates in the work of both the ISO and IEC.	1901	?	550 (1966)	?		
Canadian Standards Association (CSA) 178 Rexdale Blvd. Rexdale, Ontario M9W IR3 Canada (416) 744 4010 John E. Kean, Pres.	A national, independent, private sector organization to provide for standardization by voluntary agreement of interested parties through the consensus principle. CSA is a participant in the National Standards System sponsored by the Standards Council of Canada, and participates in the work of the ISO and IEC. The CSA publishes over 1,000 standards in over 30 major areas, including firesafety.	1919	2,300	600	?	X	X

U.S. Government Agencies

Name	Description	Founding Date
Consumer Product Safety Commission (CPSC) 1111 Eighteenth St., NW Washington, DC 20207 (202) 634-7740 Nancy Harvey Steorts, Chairman	An independent federal regulatory agency with responsibility for implementing provisions of the Flammable Fabrics Act and the Federal Hazardous Substances Act. It also encourages and assists in the development of voluntary safety standards related to safety of consumer products; and establishes, where appropriate, mandatory consumer product standards.	1972
Environmental Protection Agency (EPA) 401 M St., SW Washington, DC 20460 (202) 382-2090 Ann McGill Gorsuch, Administrator	Established as an independent agency in the Executive Branch with responsibility for coordination of effective government action on behalf of environmental quality. It coordinates the activities under the Toxic Substances Control act with other agencies for the assessment and control of toxic substances; and it endeavors to abate and control pollution through a variety of research, monitoring, standards setting, and enforcement activities.	1970
Federal Aviation Administration, US Department of Transportation (FAA) 800 Independence Ave., SW Washington, DC 20591 (202) 426-4000 J. Lynn Helms, Administrator	Became a part of the DOT in 1967. Charged with regulating air commerce to foster aviation safety. Issues and enforces rules, regulations, and minimum standards for a safe and efficient system of air navigation and air traffic control. Promulgates and enforces rules and regulations applicable to firesafety of civil aviation, including firesafety of air crafts, airports, and the handling and transportation of hazardous materials by air.	1967 (1926)
Federal Housing Administration, US Department of Housing and Urban Development (FHA) 451 Seventh St., SW Washington, DC 20410 (202) 655-4000 Philip Abrams, General Deputy Assistant Secretary for Housing—Deputy Federal Housing Commissioner	Promulgates and enforces minimum property standards for one- and two-family dwellings, multi-family housing, and care type housing. Insurance on mortgages and loans and direct assistance programs are conditioned in compliance with these standards. Extensive referencing of NFPA standards is made in the Minimum Property Standards.	
Federal Railroad Administration, US Department of Transportation (FRA)	Promulgates and enforces regulations concerning firesafety in rail transportation.	1966

Name	Description	Founding Date
400 Seventh St., SW Washington, DC 20590 (202) 426-0881 Robert W. Blanchette, Administrator		
General Services Administration (GSA) General Services Building Eighteenth and F Sts., NW Washington, DC 20405 (202) 655-4000 Gerald P. Carmen, Administrator	A major provider of supplies and buildings to federal agencies. Through purchase specification, GSA has major influence, not only regarding the safety of products it buys, but also of those available to the general public. GSA has made major advances in developing and adopting a systems approach to firesafety in buildings.	1949
Materials Transportation Bureau, US Department of Transportation (MTB) 400 Seventh St., SW Washington, DC 20590 (202) 755-9260 L.D. Stantman, Associate Administrator for Materials Transportation	Develops and issues regulations for the safe transportation of hazardous materials by all modes, excluding bulk transportation by water. Within the MTB, the Office of Hazardous Materials Regulations promulgates and enforces regulations for the safe transportation of hazardous materials; and the Office of Pipeline Safety Regulation establishes and enforces regulations for safe construction and operation of pipelines and gas conversion and storage facilities, the latter in conjunction with the US Coast Guard.	1975
Mine Safety and Health Administration (MSHA) 4015 Wilson Blvd. Arlington, VA 22203 (703) 235-1452 Ford B. Ford, Asst. Sec. of Labor for Mine Safety and Health	Develops and promulgates mandatory safety and health standards, ensures compliance with such standards, assesses civil penalties for violators, investigates accidents, cooperates with and provides assistance to the states in the development of effective state mine safety and health programs, improves and expands training programs, contributes to the improvement and expansion of mine safety and health research and development.	1977
National Bureau of Standards, US Department of Commerce (NBS) Washington, DC 20234 (301) 921-1000	A federal agency with a direct firesafety mission. The NBS has been engaged in fire research mainly concerned with building technology and fire testing of materials. It administers the Voluntary Product Standards program as a supplement to the activities of the private sector standardizing organizations.	1901

Name	Description	Founding Date
National Highway Traffic Safety Administration, US Department of Transportation (NHTSA) 400 Seventh St., SW Washington, DC 20590 (202) 426-1828 Raymond A. Peck, Jr., Administrator	Promulgates and enforces Federal Motor Vehicle Safety Standards, including firesafety regulations, for domestic and foreign vehicles sold in the US.	1970
Nuclear Regulatory Commission (NRC) 1717 H St., NW Washington, DC 20555 (301) 492-7000 Nunzio J. Pallidino, Chairman	Develops and implements rules and regulations for the physical protection of nuclear facilities and materials licensed by it. Extensively uses NFPA standards as the basis of regulating the fire protection of nuclear facilities.	1974
Occupational Safety and Health Administration, US Department of Labor (OSHA) 200 Constitution Ave., NW Washington, DC 20210 (202) 523-8165 Thorne G. Auchter, Asst. Secretary for Occupational Safety and Health	Establishes, develops and promulgates occupational safety and health standards. Develops and issues regulations, conducts investigations and inspections to determine the status of compliance with safety and health standards and regulations.	1970
United States Coast Guard, US Department of Transportation (USCG) 2100 Second St., SW Washington, DC 20593 (202) 426-2158 Adm. James S. Gracey, USCG, Commandant	Promulgates and enforces safety regulations, including firesafety for merchant ships, port, and offshore drilling facilities. Assists in fighting shipboard fires and fires in port facilities.	1915
Urban Mass. Transportation Administration, US Department of Transportation (UMTA) 400 Seventh St., SW Washington, DC 20590 (202) 426-4043 Arthur E. Teele, Jr., Administrator	Assists in developing mass transportation facilities and in planning and establishment of metropolitan and area-wide transportation systems. Establishes safety standards for equipment and buildings constructed with agency funds.	1968
Veterans Administration (VA) 810 Vermont Ave., NW Washington, DC 20420 (202) 393-4120 Robert P. Nimmo, Administrator	An independent agency which guarantees mortgage loans for veterans to purchase homes meeting requirements of HUD minimum property standards. VA also operates over 170 medical centers for veterans. VA requirements for fire retardant furnishings, garments, and interior finishes in hospitals are among the most stringent.	1930

STATES THAT HAVE ADOPTED MODEL BUILDING AND FIRE CODES

State	Building Code					Electrical Code		Fire Code					Fire Prevention Code							Life Safety Code (Means of Egress)				
	BOCA Bldg. Code (BOCA)	National Bldg. Code (AIA)	Standard Bldg. Code (SBCCI)	Uniform Bldg. Code (ICBO)	State Bldg. Code	National Electrical Code (NFPA)	State Electrical Code	BOCA Fire Code (BOCA)	National Fire Codes (NFPA)	Standard Fire Code (SBCCI)	Uniform Fire Code (JCBO)	State Fire Code	AIA Fire Prevention Code (AIA)	BOCA Fire Prevention Code (BOCA)	National Fire Codes (NFPA)	Life Safety Code (NFPA)	Standard Fire Prov. Code (SBCCI)	Uniform Fire Prov. Code (ICBO)	State Fire Prevention Code	BOCA Fire Code (BOCA)	Life Safety Code (NFPA)	Standard Fire Code (SBCCI)	Uniform Fire Code (ICBO)	State Fire Code
ALABAMA			X[t]			X[t]											X[t]				X[t]			
ALASKA																								
ARIZONA																								
ARKANSAS		X	X[t]			X						X							X		X			
CALIFORNIA				X		X					X							X					X	X
COLORADO				X		X																	X	
CONNECTICUT	(X)				X	X						X				X					X			
DELAWARE						X			X										X		X			

State	Building Code					Electrical Code		Fire Code					Fire Prevention Code							Life Safety Code (Means of Egress)				
FLORIDA		X	X		X	X						X^F							X^F		X			
GEORGIA			(X)		X	(X)	X		X						X						X			
HAWAII																								
IDAHO				X		X					X										X			
ILLINOIS												X							X					X
INDIANA				(X)	X		X											(X)	X				(X)	X
IOWA				(X)	X	X	X					X^F							X^F					X^F
KANSAS				X^S		X^S															X^S			
KENTUCKY	(X)				X	(X)	X					X			(X)				X		(X)			X
LOUISIANA			X^H			X			X							X					X			
MAINE						X			X^P						X^P						X			
MARYLAND	(X)				X	(X)	X		(X)			X							X					X
MASSACHUSETTS	(X)				X	(X)	X	(X)				X		(X)					X	(X)				X
MICHIGAN	(X)				X	(X)	X	(X)				X							X	(X)				X
MINNESOTA				(X)	X	(X)	X				X							X					X	
MISSISSIPPI			X			X^t											X				X			
MISSOURI																								

MONTANA				X		X					X							X					X	
NEBRASKA						X						X^F							X^F					X^F
NEVADA				X^t		X					X^t										X^t			
NEW HAMPSHIRE	X					X			X^P					X							X			
NEW JERSEY	(X)				X	(X)	X	(X)				X												X
NEW MEXICO				X		X					X										X			
NEW YORK					X	(X)	X					X							X					X
NORTH CAROLINA			(X)		X	X				(X)		X	X									(X)		X
NORTH DAKOTA				X		X					X					X					X			
OHIO	(X)				X		X	(X)				X		(X)					X	(X)				X
OKLAHOMA	(X)				X				X^{Pt}												X^t			
OREGON				(X)	X	(X)	X				(X)	X			X								(X)	X
PENNSYLVANIA												X							X					X
RHODE ISLAND	(X)				X	(X)	X					X							X					X
SOUTH CAROLINA			X			X				X											X			
SOUTH DAKOTA						X			X^P		X					X					X			
TENNESSEE			X			X	X		X						X						X			
TEXAS															X^P									X
UTAH				X^B		X			X		X							X	X		X			

State	Building Code					Electrical Code		Fire Code					Fire Prevention Code							Life Safety Code (Means of Egress)				
VERMONT		X				X			X^P						X^P						X			
VIRGINIA	X					X		X												X				
WASHINGTON				X		X																		
WEST VIRGINIA						X						X							X					X
WISCONSIN					X	X						X			X^P				X					X
WYOMING				X		X					X							X					X	
PUERTO RICO	(X)			(X)	X	(X)	X	(X)			(X)	X			(X)				X	(X)			(X)	X
VIRGIN ISLANDS					X	X						X							X					X

The above information was compiled from the *1982 Directory of State Building Codes and Regulations* published and copyrighted by the National Conference of States on Building Codes and Standards, Inc. (NCSBCS), 481 Carlisle Drive, Herndon, Virginia 22070. The complete *Directory* containing 22 different code areas, is available from NCSBCS at per copy prices of $52.50 for non-members of the NFPA and $40 for NFPA members. Call (703) 437–0100, extension 45, to order.

t – State Buildings
S – Schools
H – High rise
P – Partial
F – Fire Marshal Rules
B – Bldg. built w/ state money only
(X) – Based upon this code

NFPA Codes and Standards Development

Modern firesafety standards trace their origins to the nineteenth century development of automatic sprinklers. From the beginning, sprinklers performed well as extinguishing devices; however, they originally were installed in so many different ways that their reliability was uncertain.

In 1895 a small group of men representing sprinkler and fire insurance interests gathered in Boston to discuss these inconsistencies. They knew that nine radically different standards for piping size and sprinkler spacing could be found within 100 miles of the city. They realized that this plumber's nightmare had to be resolved or the rate of sprinkler system failure might prove unacceptable.

The group eventually created a standard for the uniform installation of sprinklers. The descendant of that standard can be found today among some 270 specific firesafety standards maintained by the National Fire Protection Association (NFPA).

The NFPA Standards-Making System

The NFPA has achieved its public esteem only through the careful building and constant monitoring of an open standards-development process. How the NFPA standards-making system works is described in the following paragraphs.

Administration of the System

The NFPA Board of Directors has general charge of all NFPA activities and it adopts Regulations Governing Committee Projects under which all committees involved in standards making operate. The Board also appoints a 13-person Standards Council to administer the Regulations. Members of the Council are familiar with the technical and standards development functions of the Association and are selected from a broad range of appropriate interests. The Secretary of the Council is a Vice President of the Association staff.

New Projects

Anyone can suggest the need for a new firesafety standard. An announcement of a request for a new standard is made in the NFPA membership newsletter, *Fire News*; in the American National Standards Institute publication, the *ANSI Reporter*; and in relevant trade and professional journals. Comments are requested on the need for the standard, what organizations may be active in the subject matter of the standard, what resource material is available, and who would be interested in participating in the writing of the standard.

The proposed standard and the public comments it generates are then turned over to the NFPA Standards Council for action on whether or not a project will be established to prepare the standard. If the Council determines the need for the proposed project, it either assigns the project to an existing technical committee or establishes a new committee reflecting a fair balance of concerned interests. All NFPA standards are developed and periodically revised by these technical committees — willing experts representing the government, educational institutions, business, insurance, industry, and consumers. Some 2,400 persons with diverse interests and expertise in firesafety comprise the approximately 170 technical committees within the NFPA standards-making system. Each committee member is classified by interest and each committee is structured so that not more than ⅓ of the membership is from a single interest. Each committee is assigned a scope of activitiy so as to avoid conflict or duplication of effort.

Technical Committee Activities

After a technical committee has been established by the Standards Council, the Association issues public notices announcing the committee's next meeting date and calling for specific proposals from interested persons. Proposals may be made for text to be in a new standard or for text to amend an existing standard. This public notice appears in *Fire News*, the *ANSI Reporter*, and relevant trade journals.

The committee meets to consider all proposals received. Eventually, the committee drafts a proposed standard, or amendments to an existing standard, reflecting approval by at least 2/3 of its members.

All the proposals considered, together with the committee's action on each (including the reasons for not accepting any proposal), are published as the Committee's Report in the NFPA's *Technical Committee Reports* (TCR), as is the draft of a proposed new standard. These TCRs, which are widely distributed, are sent automatically to each proposer and are available to anyone upon request. Over a 60-day period, the Association solicits public comments on all TCRs.

Technical Committee Documentation

Public comments on the TCRs are considered by the appropriate technical committees. All comments, committee action on comments, and committee reasons for not accepting comments are published as the Committee's Supplementary Report in the NFPA's *Technical Committee Documentation* (TCD). The documentation is furnished automatically to each commentor and is available to anyone upon request.

The Committee's Report and Supplementary Report are then presented for open debate at either of NFPA's semiannual meetings held in various cities throughout the United States and Canada in May and November. Anyone, regardless of membership in NFPA, may present views at these meetings. With all views known, an informed NFPA membership votes to approve, amend, return a portion of the report to committee, or return the report to committee. The Standards Council then decides whether or not to issue the standard, based on all of the information presented to it, including the vote of the membership. If the standard is issued by the Standards Council, it is published in booklet form and also included in the appropriate volume of NFPA's annually published *National Fire Codes*®. Availability of the printed standard is then widely publicized by the Association.

Procedural Safeguards

The NFPA staff constantly monitors the committee activities to ensure compliance with the Regulations Governing Committee Projects.

Complaints and Appeals

Anyone dissatisfied with action taken within NFPA's standards-making system may file a complaint to the Association's Standards Council. Areas of complaint may cover: the Standards Council's decision on whether a certain standard should be developed; the Association's action on a proposed committee report; the technical validity or fairness of a certain standard; and the Council's decision on the appointment of a nominee to a committee. Appeals on the action of the Standards Council may be made to the Board of Directors.

Public Notice

The NFPA constantly seeks out new ways to encourage technical and consumer input to the standards-making system. Public notices play a major role in fulfilling this objective. Currently, eleven steps are subject to some form of public notice: the intent to develop a standard; the schedule of technical committee meetings; the call for proposals to develop or amend a standard; the disposition of the proposals; the availability of draft standards for public review and comment; the disposition of specific public comments; announcements of all Association meetings; announcements on the fate of each proposed standard; and finally, frequent notices dealing with changes to the standards-making system.

How NFPA Standards Are Used

Association standards become more widely adopted each year as increasing numbers of government, insurance, and industry officials recognize the scope of America's tragic fire problem. Already millions of Americans are protected from fire each day by NFPA standards.

The miles of electrical wiring that run through homes and offices create an obvious potential fire hazard; however, the hazard is minimal since the installation of most electrical systems is governed by the NFPA's *National Electrical Code*® — the most widely accepted safety code in existence. The Association's *Life Safety Code*®, adopted for use by some two-thirds of the states, ensures that high-rise buildings, nursing homes, hospitals, theaters, and similar facilities are constructed for life safety from fire. The Code is now federal law for health-care facilities that receive Medicare or Medicaid benefits. (See "States That Have Adopted Model Building Codes" also in this Section.)

Scores of other NFPA standards have been referenced by the federal government's Occupational Safety and Health Administration, the Veterans Administration, the Department of Housing and Urban Development, and other federal agencies. (See "Federal Regulations that Reference NFPA Standards" that follows this article.)

Why Are NFPA Standards so Widely Accepted?

NFPA develops "consensus" standards — those that are built on a foundation of maximum participation and substantial agreement by a broad variety of interests. This philosophy has led to the production of reasonable standards that provide adequate protection to the public, yet do not stifle design or development.

NFPA prides itself in supporting a flexible system that depends largely on volunteers and therefore produces firesafety standards at practically no cost to taxpayers. But the

SEQUENCE OF EVENTS LEADING TO PUBLICATION OF A COMMITTEE DOCUMENT

Technical Committee.

↓

Call for Proposals to amend existing document or for a new document.

↓

Committee meets to act on Proposals,
to develop its own Proposals, and to prepare its Report.

↓

Committee is balloted on action on Proposals. If ⅔rds approve, Report goes forward.
Lacking ⅔rds approval, Report returned to committee.

↓

Report is published for public review and comment (Technical Committee Reports).

↓

Committee meets to act on each public comment.

↓

Committee is balloted on action on comments. If ⅔rds approve, action
(Technical Committee Documentation) is published.
Lacking ⅔rds approval, action is returned to committee.

↓

NFPA meets and acts on Committee Report and TCD.

↓

Committee balloted on any amendments to Report approved at NFPA meeting.

↓

Standards Council decides whether or not to issue standard based on all evidence
before it or to take other action.

process doesn't stop with the completion of a standard. The rapid pace of technology requires frequent updating and the NFPA's system has a built-in mechanism for such regular, periodic updating. Finally, NFPA standards consistently have withstood judicial scrutiny, lending further credence to the Association's tradition of openness and fairness.

Monitoring the Process

NFPA continues to seek out and correct flaws in the standards-making process. The Association constantly keeps an eye open for potential unfairness and any possibility of legal violation.

This spirit of self-improvement has helped foster a successful, longstanding relationship between government and the private sector, avoiding the need for a costly federal standards-making machine. And the relationship will continue as NFPA continues to maintain a system based on widespread, voluntary participation and procedural fairness.

Schedule for Processing NFPA Committee Reports

1983 Fall Meeting

July 23, 1982 — Proposal Closing Date
October 15, 1982 — Final Date for Committee to Meet on Report
October 15, 1982 — All Report Copy in Hands of Staff Liaison (ballots excepted)
November 5, 1982 — Final Date for Mailing Technical Committee Ballot
December 3, 1982 — Final Date for Mailing Correlating Committee Ballot
December 31, 1982 — Receipt of Ballots by Staff Liaison
February 25, 1983 — Committee Reports Mailed
May 13, 1983 — Comment Closing Date
May 16-19, 1983 — Annual Meeting (discussion of Committee Reports)
June 10, 1983 — Final Date for Committee to Meet on Documentation
June 10, 1983 — All Committee Documentation in Hands of Staff Liaison (ballots excepted)
June 20, 1983 — Final Date for Mailing Technical Committee Ballot
July 18, 1983 — Final Date for Mailing Correlating Committee Ballot
August 15, 1983 — Receipt of Ballots by Staff Liaison
September 26, 1983 — Committee Documentation Mailed
November 14-16, 1983 — Fall Meeting

1984 Annual Meeting

July 30, 1982 — Notification to Secretary, Standards Council of Intent to Enter Cycle
January 14, 1983 — Proposal Closing Date
April 8, 1983 — Final Date for Committee to Meet on Report
April 8, 1983 — All Report Copy in Hands of Staff Liaison (ballots excepted)
April 29, 1983 — Final Date for Mailing Technical Committee Ballot
May 27, 1983 — Final Date for Mailing Correlating Committee Ballot
June 24, 1983 — Receipt of Ballots by Staff Liaison
August 19, 1983 — Committee Reports Mailed
November 4, 1983 — Comment Closing Date
November 14-17, 1983 — Fall Meeting (discussion of Committee Reports)
December 9, 1983 — Final Date for Committee to Meet on Documentation
December 9, 1983 — All Committee Documentation in Hands of Staff Liaison (ballots excepted)
December 16, 1983 — Final Date for Mailing Technical Committee Ballot
January 13, 1984 — Final Date for Mailing Correlating Committee Ballot
February 10, 1984 — Receipt of Ballots by Staff Liaison
March 23, 1984 — Committee Documentation Mailed
May 21-24, 1984 — Annual Meeting

1984 Fall Meeting

February 4, 1983 — Notification to Secretary, Standards Council of Intent to Enter Cycle
July 22, 1983 — Proposal Closing Date
October 14, 1983 — Final Date for Committee to Meet on Report
October 14, 1983 — All Report Copy in Hands of Staff Liaison (ballots excepted)
November 4, 1983 — Final Date for Mailing Technical Committee Ballot
December 2, 1983 — Final Date for Mailing Correlating Committee Ballot
December 30, 1983 — Receipt of Ballots by Staff Liaison
February 24, 1984 — Committee Reports Mailed
May 11, 1984 — Comment Closing Date
May 21-24, 1984 — Annual Meeting (discussion of Committee Reports)
June 8, 1984 — Final Date for Committee to Meet on Documentation
June 8, 1984 — All Committee Documentation in Hands of Staff Liaison (ballots excepted)
June 15, 1984 — Final Date for Mailing Technical Committee Ballot
July 13, 1984 — Final Date for Mailing Correlating Committee Ballot
August 10, 1984 — Receipt of Ballots by Staff Liaison
September 21, 1984 — Committee Documentation Mailed
November 12-15, 1984 — Fall Meeting

1985 Annual Meeting

July 29, 1983 — Notification to Secretary, Standards Council of Intent to Enter Cycle
January 13, 1984 — Proposal Closing Date
April 6, 1984 — Final Date for Committee to Meet on Report
April 6, 1984 — All Report Copy in Hands of Staff Liaison (ballots excepted)
April 27, 1984 — Final Date for Mailing Technical Committee Ballot
May 25, 1984 — Final Date for Mailing Correlating Committee Ballot
June 22, 1984 — Receipt of Ballots by Staff Liaison
August 17, 1984 — Committee Reports Mailed
November 2, 1984 — Comment Closing Date
November 12-15, 1984 — Fall Meeting (discussion of Committee Reports)
December 7, 1984 — Final Date for Committee to Meet on Documentation
December 7, 1984 — All Committee Documentation in Hands of Staff Liaison (ballots excepted)
December 14, 1984 — Final Date for Mailing Technical Committee Ballot
January 11, 1985 — Final Date for Mailing Correlating Committee Ballot
February 8, 1985 — Receipt of Ballots by Staff Liaison
March 22, 1985 — Committee Documentation Mailed
May 13-16, 1985 — Annual Meeting

1985 Fall Meeting

January 27, 1984 — Notification to Secretary, Standards Council of Intent to Enter Cycle
July 13, 1984 — Proposal Closing Date
October 5, 1984 — Final Date for Committee to Meet on Report
October 5, 1984 — All Report Copy in Hands of Staff Liaison (ballots excepted)
October 26, 1984 — Final Date for Mailing Technical Committee Ballot
November 23, 1984 — Final Date for Mailing Correlating Committee Ballot
December 21, 1984 — Receipt of Ballots by Staff Liaison
February 15, 1985 — Committee Reports Mailed
May 3, 1985 — Comment Closing Date
May 13-16, 1985 — Annual Meeting (discussion of Committee Reports)
June 14, 1985 — Final Date for Committee to Meet on Documentation
June 14, 1985 — All Committee Documentation in Hands of Staff Liaison (ballots excepted)
June 21, 1985 — Final Date for Mailing Technical Committee Ballot
July 19, 1985 — Final Date for Mailing Correlating Committee Ballot

August 16, 1985 — Receipt of Ballots by Staff Liaison
September 27, 1985 — Committee Documentation Mailed
November 18-21, 1985 — Fall Meeting

What Each NFPA Standard Covers

The following guide to descriptions of NFPA Standards is arranged by subject. For example, if you need to know whether NFPA has developed a standard for ground ladders, look under the title "Fire Department Equipment." Under that heading, find "Fire Department Ground Ladders, NFPA 1931."

Atomic Energy

Facilities Handling Radioactive Materials, NFPA 801: Recommended practices dealing with practices aimed at reducing the risks of fire and explosion and minimizing the associated damage by radioactive contamination facilities handling radioactive materials. Recommendations apply to all locations, exclusive of nuclear reactors, where radioactive materials are stored, handled or used, including hospitals, laboratories, and industrial properties.
Nuclear Research Reactors, NFPA 802: Recommended practices for protection of life and property from fire in nuclear research reactor facilities.
Fire Protection for Nuclear Power Plants, NFPA 803: Standard covers the protection of nuclear electric generating facilities from the consequences of fire including safety to life, protection of property, and continuity of production. Provides guidance for those involved with design, construction, operation and protection.

Aviation

Standard for Aircraft Fuel Servicing, NFPA 407: Standard for fueling all types of aircraft on the ground, fueling hose, tank vehicles, airport fixed fueling systems. Additional guidance on static electricity and radar equipment. Updated with SI units.
Standard on Aircraft Maintenance, NFPA 410: Standard on aircraft electrical, oxygen and fuel systems; cleaning, painting and paint removal, welding, cabin cleaning and refurbishing operations. *Recommended Practice on Aircraft Interior Fire Protection Systems*, NFPA 421: Recommendations for aircraft interior fire detection and suppression systems.
Standard on Aircraft Hangars, NFPA 409: Standard covering specialized construction requirement and protection criteria for hangars designed to serve all types of aircraft.
Airport Fueling Ramp Drainage, NFPA 415: Standard on the water drainage system to control fuel spilled on ramp.
Airport Terminal Buildings, NFPA 416: Standard covering special construction and protection requirements for airport passenger terminals.
Aircraft Loading Walkways, NFPA 417: Standard on performance requirements to permit use under adverse fire exposure conditions covering construction features, protection methods.
Roof-Top Heliport Construction and Protection, NFPA 418: Fire protection standard for heliports on rooftops.
Recommended Practice for Master Planning Airport Water Supply Systems for Fire Protection, NFPA 419: Recommended practices covering methods of calculating and designing airport water supply systems for fire protection of all facilities regardless of ownership.
Aircraft Engine Test Facilities, NFPA 423: Firesafety standard covering location, construction, services, utilities, fire protection, operation, and maintenance for test cells, test stands, and engine run-up enclosures.

Recommended Practices for Aircraft Rescue and Fire Fighting, NFPA 402: Recommended practice for effective use of rescue and fire fighting equipment at airports.
Aircraft Rescue and Fire Fighting Services at Airports and Heliports, NFPA 403: Recommended practices for aircraft rescue and fire fighting services located on airports and heliports, including extinguishants, discharge rates, vehicle performance needs, manpower, and related subjects.
Manual on Aircraft Rescue and Fire Fighting Techniques for Fire Departments Using Structural Fire Apparatus and Equipment, NFPA 406M: Manual on fire control and rescue procedures for off-airport accidents where only structural fire apparatus is available.
Aircraft Fire Investigators' Manual, NFPA 422M: A "how-to" instructional manual
Airport Emergency Planning, NFPA 424: Recommended practice covers all phases of emergency planning at airports.
Standard for Aircraft Hand Fire Extinguishers, NFPA 408: Standard on type, capacity, location needed for aircraft compartment protection.
Evaluating Foam Fire Fighting Equipment on Aircraft Rescue and Fire Fighting Vehicles, NFPA 412: Standard on field quality testing of foams for crash-rescue control.
Aircraft Rescue and Fire Fighting Vehicles, NFPA 414: Standard covering vehicular requirements for specialized airport-based rescue and fire fighting vehicles and fire extinguishing equipment utilized thereon.

Blower Systems

Blower and Exhaust Systems for Dust, Stock and Vapor Removal, NFPA 91: Standard covering fans, ducts, duct clearances, system design, dust collecting systems.

Boiler-Furnace Explosions

Fuel Oil- and Natural Gas-Fired Burner Boiler-Furnaces, NFPA 85A: Standard for single burner watertube and firetube boiler-furnaces rated at 10,000 pounds of steam per hour and above. Includes design, installation, operation and maintenance.
Natural Gas-Fired Multiple Burner Boiler-Furnaces, NFPA 85B: Standards for the design, installation and operation of these boiler-furnaces, their fuel-burning systems and related control equipment, including two-burner systems.
Fuel Oil-Fired Multiple Burner Boiler-Furnaces, NFPA 85D: Following general guidance and definitions, this standard outlines equipment requirements, sequencing of operations, interlock and alarm requirements, including two-burner systems.
Pulverized Coal-Fired Multiple Burner Boiler-Furnaces, NFPA 85E: Minimum standards for design, installation, operation of fuel-burning systems and related control equipment.
Pulverized Fuel Systems, NFPA 85F: Standard for the design, installation, operation, maintenance and personnel safety, covering area from the raw fuel bunker to where fuel enters furnace.
Implosions in Multiple Burner Boiler-Furnaces, NFPA 85G: Standard for the design, installation and operation of boiler-furnaces to prevent furnace implosions and to contribute to operating safety.

Building Construction

Air Conditioning and Ventilating Systems, NFPA 90A: Standard to restrict spread of smoke, heat and fire through duct systems, minimize ignition sources and permit system use for the additional purpose of emergency smoke control.
Warm Air Heating and Air Conditioning Systems, NFPA 90B: Standard on supply ducts, controls, clearances, heating panels, return ducts, air filters, heat pumps etc., for one- and two-family dwellings or spaces not exceeding 25,000 cu ft volume in any occupancy.

Roof Coverings, NFPA 203M: Recommended general information on roof coverings and their fire characteristics.

Guide for Smoke and Heat Venting, NFPA 204M: Guide offering information on principles, type of vents, venting ratios, curtain boards, inspection and maintenance, heat release data.

Guide for Plastics in Building Construction, NFPA 205M-T: A revision of a tentative guide adopted by the Association in 1972. Discusses the characteristics of plastics used in building construction which should be considered by designers, prospective users, and regulatory authorities concerned about firesafety.

Standard on Types of Building Construction, NFPA 220: Defines standard types of building construction and the terms "limited combustible" and "noncombustible" as applied to building construction materials.

Standard on Fire-Retardant Impregnated Wood and Fire-Retardant Coatings for Building Materials, NFPA 703: This standard describes treatments by pressure impregnation or by surface coatings.

Safeguarding Building Construction and Demolition Operations, NFPA 241: Standard on firesafety during erection, alteration and demolition.

Recommended Practice for Protection of Buildings from Exterior Fire Exposures, NFPA 80A: Recommended minimum requirements for protection against fire exposure.

Fire Doors and Windows, NFPA 80: Standard on the use, installation, and maintenance of fire doors, windows, glass blocks, shutters.

Guide on Building Areas and Heights, NFPA 206M: Directs attention to factors which may affect area and height limitations.

Carbon Dioxide

Carbon Dioxide Extinguishing Systems, NFPA 12: Standard on total flooding, local application and hose line systems.

Chemicals and Explosives

Standard on Fire Protection for Laboratories Using Chemicals, NFPA 45: This standard establishes basic requirements for the protection of life and property in laboratories handling hazardous chemicals. The standard is especially designed to protect persons from the effects of toxic, corrosive or otherwise potentially harmful chemicals to which they may be exposed as a result of fire or explosions.

Purged and Pressurized Enclosures for Electrical Equipment in Hazardous (Classified) Locations, NFPA 496: Standard for the design of equipment to eliminate or reduce a hazardous atmosphere.

Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1 Hazardous Locations, NFPA 493: Standard for the construction and evaluation of equipment of limited energy for use in hazardous locations.

Recommended Practice for Classification of Class I Hazardous Locations for Electrical Installations, NFPA 497: Recommended practice for classifying the zones of potential hazards from flammable atmospheres in chemical plants.

Code for Explosive Materials, NFPA 495: Covers reasonable regulations for safety in the manufacture, storage, transportation, and use of explosives and blasting agents of the type where common usage is incidental to mining, quarrying, road building, harbor improvement, and similar operations, including their usage on farms.

Standard on Explosives Motor Vehicle Terminals, NFPA 498: Standard for prevention or spreading of fires into explosives motor vehicle terminals or interchange lots.

Manual of Hazardous Chemical Reactions, NFPA 491M: Contains over 3,500 potentially dangerous chemical reactions reported in technical publications and by sources within the chemical field.

Hazardous Chemicals Data, NFPA 49: Chemicals included have one or more of the following criteria: a health hazard, a reactivity rating, an unusual storage or fire fighting problem. Data includes life and fire hazard precautions.

Standard for Cellulose Nitrate Motion Picture Film, NFPA 40: Standard provisions for the storage and handling of nitrate motion picture film. Includes data on film cabinets, vaults, archival vaults, projection, film exchanges, studios.

Storage of Liquid and Solid Oxidizing Materials, NFPA 43A: A code for reducing hazards from fires and explosions when liquid and solid oxidizing materials are in storage. Establishes four classes of oxidizing materials and storage requirements.

Code for the Storage of Gaseous Oxidizers, NFPA 43C: A code for reducing hazards from fires and explosions when gaseous oxidizing materials are in storage. Covers oxidizing materials which are gases at ambient temperatures or liquids having vapor pressures exceeding 40 psi at 100°F.

Code for Storage of Pesticides, NFPA 43D: A standard that can be applied to the commercial storage of pesticides both indoors and outdoors in containers under a 660-gallon capacity.

Storage of Pyroxylin Plastic, NFPA 40E: A code for safe storage of pyroxylin plastics in manufacturing buildings, warehouses, jobbing shops and retail outlets.

Code for the Storage of Ammonium Nitrate, NFPA 490: Storage in bags, drums and other containers and in bulk, with suggested regulations.

Chimneys and Other Heat and Vapor Removal Equipment

Chimneys, Fireplaces, Vents and Solid Fuel Burning Appliances, NFPA 211: Standard on safe installation and use in residential, commercial, and industrial applications.

Manual on Clearance for Heat-Producing Appliances, NFPA 89M: A compilation of recommended clearances.

Standard Glossary of Terms Relating to Chimneys, Vents and Heat-Producing Appliances, NFPA 97M: Definitions of terms to achieve uniformity in use.

Incinerators, Waste and Linen Handling Systems and Equipment, NFPA 82: Standard for installation and use of compactors, incinerators, waste and linen chutes, and disposal of waste.

Removal of Smoke and Grease-Laden Vapors from Commercial Cooking Equipment, NFPA 96: Standard on the design, installation and use of exhaust system components including hoods, grease removal devices, exhaust ducts, dampers air moving devices, auxiliary equipment, fire extinguishing equipment.

Combustible Metals

Processing, Handling and Storage of Magnesium, NFPA 48: Standard on fire and explosion hazards in magnesium foundries, processing plants, and the commercial storage of magnesium. Includes machining and fabrication, scrap handling, storage, fire protection.

Production, Processing, Handling and Storage of Titanium, NFPA 481: Standard covering properties and characteristics of titanium, sponge production, melting plants and mills, machine shops, powder production and use, special hazards, and fire control and extinguishment.

Production, Processing, Handling and Storage of Zirconium, NFPA 482: Standard covering flammable properties and explosive characteristics, uses of zirconium, fire prevention, dust collection, sludge, scrap disposal.

Cutting and Welding Practices

Fire Prevention in Use of Cutting and Welding Processes, NFPA 51B: Standard for management on fire prevention and protection precautions.

Dry Chemical Extinguishing Systems

Dry Chemical Extinguishing Systems, NFPA 17: Standard on total flooding, local application, hand hose line systems, with additional guidance on shutdown of normally heated hazards.

Dust Explosion Hazards

Manufacturing and Handling of Starch, NFPA 61A: Standard on hazards in handling dried starch and precautions to prevent ignition.

Grain Elevators, Bulk Grain Handling Facilities, NFPA 61B: Standard to prevent dust explosions and to minimize damage if an explosion should occur. Also covers fumigation of commodities and storage spaces.

Feed Mills, NFPA 61C: Standard construction, ventilation, equipment and miscellaneous precautions.

Agricultural Commodities, NFPA 61D: Standard for the prevention of fire and dust explosion hazards in milling of wheat, rye, barley, corn, etc.

Pneumatic Conveying of Agricultural Dusts, NFPA 66: Standard on pressure-type and suction-type systems with guidance on design safeguards of component parts of the pneumatic conveying equipment.

Dust Explosion Prevention in Plastics Industry, NFPA 654: Standard on reducing hazards in the manufacture, fabricating, molding of plastics, giving information on hazards of various plastics; a comprehensive appendix on plastic dust explosibility.

Prevention of Sulfur Fires and Explosions, NFPA 655: Standard on crushing and pulverizing hazards in handling bulk and liquid sulphur.

Also responsible for documents for the prevention, control and extinguishment of fires and explosions resulting from dusts which are not covered by other Technical Committees of the Project on Dust Explosion Hazards.

Aluminum Processing and Finishing, NFPA 65: Standard covering operations where fine metallic aluminum dust or powder is liberated.

Manufacture of Aluminum and Magnesium Powder, NFPA 651: Standard covering the manufacture of aluminum and magnesium flake powder, paste, or atomized granules. Also covers the manufacture of aluminum or magnesium alloys found to be explosive.

Prevention of Fires and Explosions in Wood Processing and Woodworking Facilities, NFPA 664: Standard for control of finely divided wood particles.

Electrical Equipment Maintenance

Recommended Practice for Electrical Equipment Maintenance, NFPA 70B: A recommended practice confined to preventive maintenance for industrial-type electrical systems and equipment to reduce hazards that result from their failure. Explains functions and economic considerations in establishing a preventive maintenance program.

Electrical Standard for Metalworking Machine Tools and for Plastics Processing Machinery, NFPA 79: Covers electric/electronic equipment, apparatus, systems, and wiring of an industrial machine tool, commencing at the place of connection of the supply to the machine tool electrical equipment; also electric equipment for use on circuits which operate from a supply voltage of 600 volts or less.

Electrical Safety Requirements for Employee Work Places

Standard for Electrical Safety Requirements for Employee Workplaces, NFPA 70E: Covers protection to the employee from electrical hazards such as shock, arc blasts and explosions initiated by electricity.

Electronic Computers Systems

Electronic Computer-Data Processing Equipment, NFPA 75: Covers requirements for installations of electronic computer/data processing equipment.

Explosion Protection Systems

Guide for Explosion Venting, NFPA 68: Provides information for the design and utilization of vents to limit pressures developed by explosions (deflagrations) of dusts or gases (vapors) in buildings, rooms, bins and equipment in order to prevent or reduce structural or mechanical damage.

Standard on Explosion Prevention Systems, NFPA 69: Covers the design, construction, operation, maintenance and testing of systems for: (a) reduction of oxidant concentration and control of combustible concentration in flammable mixtures, and (b) suppression of deflagrations.

Classification of Gases, Vapors and Dusts for Electrical Equipment in Hazardous (Classified) Locations, NFPA 497M: Manual lists the group classifications for selected gases, vapors, and dusts as specified in Article 500 of the *National Electric Code*®, to aid engineers in specifying the proper electrical equipment for hazardous (classified) locations.

Finishing Processes

Spray Application Using Flammable and Combustible Materials, NFPA 33: Covers the application of flammable or combustible materials when applied as a spray by compressed air, "airless" or "hydraulic atomization," or by steam, or electrostatic methods or by any other means in continuous or intermittent processes; also covers application of combustible powders when applied by powder spray guns, electrostatic powder spray guns, fluidized beds or electrostatic fluidized beds.

Dipping and Coating Processes Using Flammable or Combustible Liquids, NFPA 34: Applies to operations in which articles or materials are passed through contents of tanks, vats or containers of flammable liquids or combustible liquids.

Fire Department Equipment

Standard for Automotive Fire Apparatus, NFPA 1901: Covers design and construction requirements and minimum equipment regulations for fire department pumpers, aerial ladders, elevating platforms and tankers.

Testing Aerial Ladders and Elevating Platforms, NFPA 1904: Covers maintenance, care, testing and use of fire department aerial ladders and elevating platforms.

Portable Pumping Units, NFPA 1921: Covers requirements for maximum weight, operational characteristics, reliability of service and minimum performance of the different sizes of portable pumping units.

Fire Department Ground Ladders, NFPA 1931: Provides requirements for the construction, care and use of fire department ground ladders.

Fire Department Organization

Organization for Fire Services, NFPA 1201: Recommended organization, planning, fiscal management, public relations, fire prevention, investigation, etc., for municipal and private fire departments.

Recommendations for Organization of a Fire Department, NFPA 1202: Recommended legal basis for a fire deparment area, establishment of a governing body, fire department manpower and facilities, area resources, water supply.

Fire Hazards of Materials

Identification of the Fire Hazards of Materials, NFPA 704: Standard of key method to mark containers, indicating the reactivity, flammability, and health hazards of materials in storage.

Fire Hazards in Oxygen-Enriched Atmospheres

Manual on Fire Hazards in Oxygen-Enriched Atmospheres, NFPA 53M: Covers the fire and explosion hazards that may exist in oxygen-enriched atmospheres.

Fire Hose

Standards for Fire Hose, NFPA 1961: Covers construction of woven-jacketed, rubber-lined fire hose of either single or multiple jacket construction.

Care, Use, and Maintenance of Fire Hose, NFPA 1962: Covers the care, use and maintenance of fire hose, including connections and nozzles.

Screw Threads and Gaskets for Fire Hose Connections, NFPA 1963: Covers the dimensions for screw thread connections, gauges, gaskets, gasket seats and the size thread of threaded connections.

Fire Prevention Code

Fire Prevention Code, NFPA 1: General firesafety regulations and code enforcement and administration procedures used to complement the *National Fire Codes* in making them a complete fire prevention code. Includes guidelines for the development of local legislation for the enactment of a fire prevention code.

Fire Reporting

Uniform Coding for Fire Protection, NFPA 901: Provides terminology and a classification system for fire incident data which improves uniformity of data collected and used at the local government level, allows comparison of data between communities and allows aggregation of data on state and national levels for studying the fire problem.

Fire Reporting Field Incident Manual, NFPA 902M: Guide for use by the fire department officer when completing his report of an incident.

Fire Reporting Property Survey Manual, NFPA 903M: Manual which describes the completion of two forms - NFPA 903SR, "Basic Structure Report" and NFPA 903TR "Basic Occupancy Report."

Incident Follow-Up Report Manual, NFPA 904M: Manual containing instructions for the completion of the "Incident Follow-Up Report," Form 9041.

Investigation of Fires of Electrical Origin, NFPA 907M: Provides fire officers and fire investigators with guidelines and techniques for use in investigating fires to determine when a fire is of electrical origin.

Fire Safety in Racetrack Stables

Standard on Fire Safety in Racetrack Stables, NFPA 150: Covers requirements for construction, fire protection and occupancy of racetrack stable areas.

Fire Service Occupational Safety and Health

Standard for Fire Department Safety Officer, NFPA 1501: Outlines the duties and responsibilities of a Fire Department Safety Officer. Requires all fire departments to have a safety officer.

Fire Service Professional Standards Development Committee for Fire Fighter Qualifications

Standard for Fire Fighter Professional Qualifications, NFPA 1001: Identifies the professional levels of competence required of fire department members and covers the entrance requirements and first three levels of progression thereafter.

Fire Apparatus Driver/Operator, NFPA 1002: Identifies the professional levels of competence required of fire apparatus driver/operators. Covers requirements for drivers, and driver/operators of fire department pumpers, aerial apparatus, and elevating platform apparatus.

Standard for Airport Fire Fighter Professional Qualifications, NFPA 1003: Identifies the professional levels of competence required of the Airport Fire Fighter.

Fire Service Professional Standards Development Committee for Fire Inspector and Investigator Qualifications

Standard for Professional Qualifications for Fire Inspector, Fire Investigator & Fire Prevention Education Officer, NFPA 1031: Identifies the professional levels of competence required of personnel involved in fire inspection, fire investigation or fire prevention education work. Covers the requirements for three levels of progression.

Fire Service Professional Standards Development Committee for Fire Instructor Qualifications

Standard for Fire Service Instructor Professional Qualifications, NFPA 1041: Identifies the professional levels of competence required of fire service instructors.

Fire Service Professional Standards Development Committee for Fire Service Officer Qualifications

Fire Officer Professional Qualifications, NFPA 1021: Identifies the professional levels of competence required for fire department officers and covers the requirements for each of the six levels of progression.

Fire Service Training

Recommended Practice for Training Reports and Records, NFPA 9: Recommended systematic approach for officers who must develop a fire training records system for the fire department.

Fire Department Operations in Properties Protected by Sprinkler and Standpipe Systems, NFPA 13E: Recommended procedures for fire department operations in properties protected by automatic sprinklers, outside sprinkler systems for exposure protection, standpipe systems.

Training Standards on Initial Fire Attack, NFPA 1410: Method of measuring how effective the fire department's evolutions are and how effective the fire attack can be.

Guide for Training Fire Department Personnel to Inspect Dwellings, NFPA 1452: Provides the fire department training officers or other fire service personnel with a guide to the establishment of a Dwelling Fire Safety Program for their own community.

Fire Tests

Fire Test of Building Construction and Materials, NFPA 251: Applicable to assemblies of structural materials for buildings. *Fire Tests of Door Assemblies*, NFPA 252: Testing fire resistance of door assemblies in wall openings.

Flooring Radiant Panel Test, NFPA 253: Testing flame spread of floor covering systems when exposed to a flaming ignition source in a radiant heat energy environment.

Test of Surface Burning Characteristics of Building Materials, NFPA 255: Standard to evaluate flame spread over the surface, fuel contributed, smoke developed.

Fire Tests of Roof Coverings, NFPA 256: Standard measuring relative fire characteristics of roof coverings when fire originates outside the building. Test for intermittent flame exposure, flame spread, burning brands, flying brands, and prolonged exposure to weather.

Fire Test of Window Assemblies, NFPA 257: Tests of glass block and other light transmitting assemblies.

Standard Test Method for Measuring Smoke Generated by Solid Materials, NFPA 258: Test procedure for measuring smoke generated by solid materials in thickness up to and including 1 inch. Measurement conducted by attenuation of a light beam by smoke accumulating within a closed chamber due to nonflaming pyrolytic decomposition and flaming combustion. Results are expressed in terms of specific optical density. Test intended for research and development, not as a basis of rating for building purposes.

Standard Test Method for Potential Heat of Building Materials, NFPA 259: A standard test method providing a means of determining, under controlled laboratory conditions, the total potential release of heat of materials under defined fire exposure conditions.

Standard Methods of Tests and Classification System for Cigarette Ignition Resistance of Components of Upholstered Furniture, NFPA 260A: Standard test methods and classification system to evaluate the cigarette ignition resistance of upholstered furniture used in non-commercial, non-institutional, non-public assembly, non-educational occupancies.

Standard Method of Test for Determining Resistance of Mock-Up Upholstered Furniture Material Assemblies to Ignition by Smoldering Cigarettes, NFPA 260B: Standard test method to evaluate the cigarette ignition resistance of composite mock-ups of upholstered furniture used in occupancy groups such as hospitals, nursing homes, residential-custodial care and supervisory care facilities such as educational, assembly, or residential occupancies.

Fire Tests for Flame-Resistant Textiles and Films, NFPA 701: Flame-resistance requirements and test methods.

Standard Method for the Flammability of Wearing Apparel, NFPA 702: Provides methods for testing flammability of textiles used or intended for use in wearing apparel, establishes classes of flammability, and sets forth requirements which textiles shall meet to be so classified.

Most of these standards are also Standards of the American Society of Testing and Materials and Underwriters Laboratories, Inc., with essentially the same text but different identifying numbers.

Firesafety for Mobile Homes

Standard for Firesafety Criteria for Mobile Home Installations, Sites and Communities, NFPA 501A: Covers the installation of mobile homes, including mobile home park requirements.

Firesafety for Recreational Vehicles

Standard on Firesafety Criteria for Recreational Vehicles, NFPA 501C: Covers plumbing, heating and electrical systems and firesafety and life safety for travel trailers, motor homes, camping trailers and truck campers.

Standards for Firesafety Criteria for Recreational Vehicle Parks and Campgrounds, NFPA 501D: Provides construction requirements and use of land areas designated for recreational vehicle parks.

Firesafety Symbols

Standard Fire Protection Symbols for Architectural and Engineering Drawings, NFPA 172: Covers fire protection symbols for use by architects and engineers in the design of buildings and building sites.

Standard Fire Protection Symbols for Risk Analysis Diagrams, NFPA 174: Covers fire protection systems for use in the analysis of fire risk by insurance companies, engineering consultants and fire departments.

Standard Symbols for Fire Fighting Operations, NFPA 178: Presents standard references and symbols for visual alerting of firefighters during fire-related emergencies.

Flammable Liquids

Standard for Fire Hazard Properties of Flammable Liquids, Gases and Volatile Solids, NFPA 325M: Tabulation of some 1,500 substances, listed alphabetically by chemical names, 500 synonyms.

Basic Classification of Flammable and Combustible Liquids, NFPA 321: Standard terms of flash and boiling points.

Drycleaning Plants, NFPA 32: Standard safeguards incident to drycleaning and dry dyeing.

Flammable and Combustible Liquids Code, NFPA 30: Applies to all flammable and combustible liquids except those that are solid at 100°F or above. Covers tank storage, piping, valves and fittings, container storage, industrial plants, bulk plants, service stations and processing plants.

Flammable and Combustible Liquids on Farms and Isolated Construction Projects, NFPA 395: Covers the storage on farms or in rural areas of flammable and combustible liquids having a flash point below 200°F and the storage of flammable and combustible liquids on farms, rural road construction and other rural earth-moving projects where it is customary to obtain fuels in bulk and dispense or transfer them under control of the owner or contractor.

Standard on Installation of Oil Burning Equipment, NFPA 31: Covers minimum requirements for safety to life and property from fire in the installation of oil burners and the equipment used in connection with them.

Manufacture of Organic Coatings, NFPA 35: Applies to facilities and processes used for the manufacture of protective and decorative finishes or coatings for industrial, automotive, marine, transportation, institutional, household and other purposes.

Cleaning or Safeguarding Small Tanks and Containers, NFPA 327: Procedures for the safe removal of flammable vapors, liquids, gases, or solids from small tanks or containers that cannot be entered. Such procedures are to safely permit welding or cutting or other work which may create a potential fire or explosion hazard.

Leakage from Underground Flammable Liquid Tanks, NFPA 329: Recommendations for detection, testing, locating.

Flammable and Combustible Liquids and Gases in Manholes and Sewers, NFPA 328: Provides guidance to enforcement officials, fire authorities, contractors and owners of underground structures on the problems involving flammable and combustible liquids and gases which may be found in underground structures. Typical case histories of explosions in underground structures given.

Solvent Extraction Plants, NFPA 36: Covers the commercial scale solvent extraction processing of animal and vegetable oils and fats by the use of flammable solvents, except extraction processes employing liquefied petroleum gases.

Tank Vehicles for Flammable and Combustible Liquids, NFPA 385: Applies to tank vehicles used for transportation of asphalt or normally stable flammable and combustible liquids with a flash point below 200°F; covers the design and construction of cargo tanks and their appurtenances.

Portable Shipping Tanks, NFPA 386: Transportation of flammable and combustible liquids in tanks of larger than 60 gallons and up to 660 with flash point below 200°F.

Foam

Foam Extinguishing Systems and Combined Agent Systems, NFPA 11: Standard for inside hazards, exterior storage tanks, spray foam systems, monitor and hose systems.

Medium and High Expansion Foam Systems, NFPA 11A: Covers minimum requirements for the installation of medium and high expansion foam systems.

Mobile Foam Apparatus, NFPA 11C: Applies to mobile foam apparatus used for the control and extinguishment of flammable and combustible liquids fires in storage tanks and other locations involving the risk of spills of flammable liquids.

Wetting Agents, NFPA 18: Covers requirements for the performance and use of wetting agents as related to fire control and extinguishment.

Forest

Homes and Camps in Forest Areas, NFPA 224: Offers guidance on area fire protection, structural features, electrical equipment, heating and cooling equipment, fire protection, camper's rules.

Wildfire Control and Environmental Improvement, NFPA 295: Offers advice on organization and planning, hand tools, power-operated equipment, pumps, chemicals, care of equipment.

Garages and Parking Structures

Standard for Parking Structures, NFPA 88A: Covers construction and protection of parking garages.

Standard for Repair Garages, NFPA 88B: Covers construction and protection of repair garages.

Halogenated Fire Extinguishing Systems

Halon 1301 Fire Extinguishing Systems, NFPA 12A: Covers minimum requirements for halogenated agent fire extinguishing systems for the use and guidance of those charged with the purchasing, designing, installing, testing, inspecting, approving, listing, operating and maintaining of such systems.

Halon 1211 Fire Extinguishing Systems, NFPA 12B: Covers minimum requirements for halogenated agent extinguishing systems for the use and guidance of those charged with the purchasing, designing, installing, testing, inspecting, approving, listing, operating and maintaining of these systems.

Health Care Facilities

Standard for the Use of Inhalation Anesthetics, NFPA 56A: Provides requirements to protect against explosions or fires, electric shock, mechanical injury from compressed gases or compressed gas cylinders, or anoxia from erroneous gas connections.

Standard for the Use of Inhalation Anesthetics in Ambulatory Care Facilities, NFPA 56G: Covers requirements to protect against fires, electric shock and mechanical injury from compressed gases in ambulatory care facilities.

Manual on Health Care Emergency Preparedness, NFPA 3M: Manual recommending methods for writing a disaster plan for health care facilities.

Standard for Essential Electrical Systems for Health Care Facilities, NFPA 76A: Covers minimum requirements for the design, installation, operation, and maintenance of those portions of the electrical systems of health care facilities whose interruption would jeopardize the effective and safe care of institutionalized patients.

Standard for Hyperbaric Facilities, NFPA 56D: Applies to hyperbaric chambers and associated facilities which are used, or intended to be used, for medical applications or experimental procedures at pressures from 0 psig to 100 psig (14.7 psia to 114.7 psia).

Standard for Hypobaric Facilities, NFPA 56E: Covers minimum safeguards for the protection of personnel in facilities containing an oxygen-enriched atmosphere and operated at pressures less than 760 mmHg.

Safety Standard for Laboratories in Health-Related Institutions, NFPA 56C: Covers the protection against fire and explosion hazards created by laboratory activities in hospitals and health-related institutions.

Recommended Practice on Medical-Surgical Vacuum Systems in Hospitals, NFPA 56K: Provides information for the safe use of medical-surgical vacuum systems and practical advice on the design, installation, testing and maintenance of centrally-piped medical-surgical vacuum systems so that they are efficient, reliable and of adequate capacity.

Standard for Respiratory Therapy, NFPA 56B: Applies to the use of nonflammable medical gases, vapors and aerosols and the equipment required for their administration, at normal atmospheric pressure. (NFPA 56B is submitted to the Committee on Industrial and Medical Gases for concurrence before submittal to the Association for action.)

Manual for Home Use of Respiratory Therapy, NFPA 56HM: Manual giving requirements for the safe use of respiratory therapy equipment in the home.

Standard on the Safe Use of Electricity in Patient Care Areas of Hospitals, NFPA 76B: Covers hazards related to use in health care facilities of electric appliances; reliance on grounding systems; new appliances for diagnosis, therapy and monitoring; and new techniques that invade the body's natural barriers to electric shock. Covers other hazards also inherent to electric appliances in this specialized environment.

Recommended Practice on the Safe Use of High Frequency Electricity in Health Care Facilities, NFPA 76C: Covers the design and use of electrical and electronic appliances generating high-frequency currents for medical treatment in hospitals, clinics, ambulatory care facilities and dental offices.

Industrial and Medical Gases

Bulk Oxygen Systems at Consumer Sites, NFPA 50: Covers the installation of bulk oxygen systems on industrial and institutional consumer premises.

Gaseous Hydrogen Systems at Consumer Sites, NFPA 50A: Covers the general principles recommended for the installation of gaseous hydrogen systems on consumer premises where the hydrogen supply to the consumer premises originates outside the consumer premises and is delivered by mobile equipment.

Liquefied Hydrogen Systems at Consumer Sites, NFPA 50B: Covers the general principles recommended for the installation of liquefied hydrogen systems on consumer premises where the liquid hydrogen supply to the consumer premises originates outside the consumer premises and is delivered by mobile equipment.

Oxygen-Fuel Gas Systems for Welding and Cutting, NFPA 51: Covers the installation and operation of oxygen fuel gas welding and cutting systems.

Acetylene Cylinder Charging Plants, NFPA 51A: Covers the design, construction and installation of acetylene cylinder charging plants.

Nonflammable Medical Gas Systems, NFPA 56F: Covers the installation and testing of nonflammable medical gas piping systems in hospital and non-hospital based facilities.

(NFPA 56F is submitted to the Health Care Facilities Correlating Committee for concurrence before submittal to the Association for action.)

Industrial Trucks

Fire Safety Standard for Powered Industrial Trucks Including Type Designations, Areas of Use, Maintenance and Operations, NFPA 505: Applies to fork truck, tractors, platform lift trucks, motorized hand trucks and other specialized industrial trucks powered by electric motors or internal combustion engines.

Internal Combustion Engines

Stationary Combustion Engines and Gas Turbines, NFPA 37: Covers the installation and operation of stationary combustion engines and gas turbines; also covers portable engines which remain connected for use in the same location for one week or more used instead of or to supplement stationary engines.

Libraries, Museums and Historic Buildings

Protection of Libraries and Library Collections, NFPA 910: Recommended practices with case histories, new construction and guidance to safeguard lives and property.

Protection of Museums and Museum Collections, NFPA 911: Guidance for trustees, curators, directors, building superintendents and other staff members on life safety and protection of collections.

Lightning Protection

Lightning Protection Code, NFPA 78: Covers lightning protection requirements for ordinary buildings, miscellaneous structures and special occupancies, heavy-duty stacks and structures containing flammable liquids and gases.

Liquefied Natural Gas

Production, Storage and Handling of Liquefied Natural Gas, NFPA 59A: Covers the design, location, construction and operation of facilities for the liquefication of natural gas and the storage, vaporization, transfer, handling and truck transport of liquefied natural gas.

Liquefied Petroleum Gas

Standard for Storage and Handling of Liquefied Petroleum Gases, NFPA 58: Covers the design, construction, installation and operation of all LP-Gas systems.
Liquefied Petroleum Gases at Utility Gas Plants, NFPA 59: Covers utility gas plants for the design, construction, location, installation and operation of refrigerated and non-refrigerated liquefied petroleum gas systems.

Loss Prevention Procedures and Practices

Private Fire Brigades, NFPA 27: Recommendations on organizing, managing, training, inspection, maintenance and equipment.
Guard Service in Fire Loss Prevention, NFPA 601: Standard on guard service management, functions, and communications, as well as on guard selection and training.
Guard Operations in Fire Loss Prevention, NFPA 601A: Gives basis for instructing guards and defining their duties.

Marine Fire Protection

Standard for the Control of Gas Hazards on Vessels, NFPA 306: Covers vessels carrying or burning combustible or flammable liquids, carrying or having carried flammable compressed gases, chemicals in bulk or other products capable of creating a hazardous condition.
Marinas and Boatyards, NFPA 303: Berthing and repair facilities and operational hazards.
Standard for the Construction & Protection of Piers and Wharves, NFPA 87: Covers the construction and protection of piers and wharves.

Motor Craft

Motor Craft, NFPA 302: Covers the prevention of fuel leakage, the elimination of possible sources of vapor ignition from particularly dangerous locations, the provision of adequate means for keeping vital areas ventilated at all times, the avoidance of unnecessary use of combustible materials in exposed locations and the provision of proper fire extinguishing equipment.
Vessels during Construction, Repair and Lay-Up, NFPA 312: Standard for prevention, prompt discovery, retarding spread and extinguishment of fires.

Mining Facilities

Standard for the Prevention of Dust Explosions in Coal Preparation Plants, NFPA 653: Covers only plants designed to prepare or condition coal for marketing.

Standard on Fire Protection for Mobile Surface Mining Equipment, NFPA 121: Covers minimum requirements for safeguarding life and property against fire and related hazards associated with surface self-propelled mobile mining equipment.

Motor Vehicle and Highway Fire Protection

Recommended Practice on Fire Protection for Limited Access Highways, Tunnels, Bridges, Elevated Roadways, and Air Right Structures, NFPA 502: Recommended practice intended primarily for the guidance of those individuals responsible for the construction, operation, maintenance and fire protection of limited access highways, tunnels, bridges, elevated roadways and air right structures.

Standard for Truck Fire Protection, NFPA 512: Covers minimum requirements for fire protection measures for property-carrying motor vehicles.

Standard for Motor Freight Terminals, NFPA 513: Covers requirements for the prevention of loss of life and property damage from fires in motor freight terminals.

National Electrical Code®

National Electrical Code®, NFPA 70: Covers electric conductors and equipment installed within or on public and private buildings or other structures, including mobile homes and recreational vehicles and other premises such as yards, carnivals, parks and other lots and industrial substations; conductors that connect the installations to a supply of electricity; and other outside conductors on the premises.

Electrical Code for One- and Two-Family Dwellings, NFPA 70A: Excerpted and edited from most recent edition of NFPA 70. Covers Code regulations for installation of electrical services in dwellings.

National Fuel Gas Code

National Fuel Gas Code, NFPA 54: General criteria for the installation, operation and maintenance of gas piping, gas appliances and nonspecialized gas equipment on residential, commercial and industrial premises for use with fuel gases, manufactured gas, LP-Gas in the vapor phase, LP-Gas-air mixtures, or mixtures of these gases (including mixtures within the flammable range) at pressures up to and including 60 psi.

Ovens and Furnaces

Ovens and Furnaces, NFPA 86A: Standard covering "Class A" ovens or furnaces - heat utilization equipment operating at approximately atmospheric pressures and at temperatures below 1400°F and where there is an explosion hazard from either, or a combination of, the fuel in use, flammable volatiles from materials in the ovens, or catalytic combustion systems. Requirements on location, construction, heating system, ventilation, safety control equipment, fire protection.

Industrial Furnaces, NFPA 86B: Standard covering "Class B" furnaces which are those operating at approximately atmospheric pressures and temperatures exceeding approximately 1400°F. Standard deals with location, construction, heating systems, ventilation, safety controls and fire protection considerations.

Industrial Furnaces Using a Special Processing Atmosphere, NFPA 86C: Standard covering "Class C" furnaces which utilize a special processing atmosphere, including salt baths, utilizing any type of heating system. Requirements on location, construction, heating system, safety control equipment, operation and fire protection.

Industrial Furnaces Using Vacuum as an Atmosphere, NFPA 86D: Standard applies to "Class D" industrial furnaces - those operating at temperatures above ambient to over 5000°F and at pressures normally below atmosphere. Covers design, construction and protection of vacuum furnaces.

Portable Fire Extinguishers

Standard for Portable Fire Extinguishers, NFPA 10: Covers minimum requirements for the selection, installation, inspection, maintenance and testing of portable extinguishing equipment.

Model Enabling Act for the Sale or Leasing and Servicing of Portable Fire Extinguishers, NFPA 10L: Regulations on portable fire extinguisher sales and servicing to aid in safeguarding lives and property.

Protective Equipment for Fire Fighters

Standard on Protective Clothing for Structural Fire Fighting, NFPA 1971: Covers protective clothing for structural fire fighting worn for protection against extremes of temperature, steam, hot water, hot particles and other hazards encountered during fires and related life saving.

Structural Fire Fighters' Helmets, NFPA 1972: Applies to helmets utilized for structural fire fighting.

Self-Contained Breathing Apparatus for Fire Fighters, NFPA 1981: Specifies Self-Contained Breathing Apparatus for structural fire fighting and other conditions where respiratory hazards are encountered, or where the potential for such hazards exists.

Public Fire Service Communications

Standard for Public Fire Service Communications, NFPA 1221: Covers the installation, maintenance and use of all public fire service communications.

Pyrotechnics

Code for the Manufacture, Transportation, and Storage of Fireworks, NFPA 44A: Code on safety precautions in the manufacture of fireworks, and protection should accident occur.

Model State Fireworks Law, NFPA 1121L: An act to prohibit the sale, offering or exposing for sale of fireworks. The Act defines "fireworks" and regulates the manner of using fireworks with penalties for violation of the provisions of the Act.

Code for Unmanned Rockets, NFPA 1122: Provides safe outlets to the experimental urges of the general public regarding rockets, to discourage the making and use of dangerous homemade rocket devices and to discourage experimentation with explosive or highly energetic propellant materials.

Public Display of Fireworks, NFPA 1123: Requirements for construction, handling, and use of public display fireworks, including site selection criteria and requirements for operation of the display. (In cooperation with the Standards Council.)

Safety to Life

Life Safety Code®, NFPA *101* (formerly the Building Exits Codes): Deals with life safety from fire and similar emergencies. Covers construction, protection and occupancy features to minimize danger to life from fires, smoke, fumes or panic before buildings are vacated.

Tents, Grandstands and Air-Supported Structures Used for Places of Assembly, NFPA 102: Covers the construction, location, protection and maintenance of tents and air-supported structures used for places of assembly; temporary, permanent and portable grandstands and bleachers; interior folding or telescopic seating normally used in gymnasiums, multi-use rooms and similar indoor mass seating.

Signaling Systems

Standard for Central Station Signaling Systems, NFPA 71: Covers the installation, maintenance and use of central station signaling systems.

Standard on Automatic Fire Detectors, NFPA 72E: Covers minimum requirements for the performance, location, mounting, testing and maintenance of automatic fire detectors for protection of the occupant, building, space, structure, area or object to be protected in accordance with the stated purpose.

Standard for Household Fire Warning Equipment, NFPA 74: Covers requirements for selection, installation, operation and maintenance of fire warning equipment for use within family living units.

Standard for Local Protective Signaling Systems, NFPA 72A: Covers the installation, maintenance and use of local protective signaling systems for guard's tour, fire alarm and supervisory service.

Auxiliary Protective Signaling Systems, NFPA 72B: Covers the installation, maintenance and use of auxiliary protective signaling systems for fire alarm service.

Standard for Remote Station Protective Signaling Systems, NFPA 72C: Covers electrically supervised circuits employing a direct circuit connection between signaling devices at the protected premises and signal receiving equipment in a remote station.

Standard for Proprietary Signaling Systems, NFPA 72D: Covers the installation, maintenance and use of proprietary protective signaling systems for guard, fire alarm and supervisory service.

Static Electricity

Recommended Practice on Static Electricity, NFPA 77: Covers methods for control of static electricity for the purpose of eliminating or mitigating its fire hazard.

Storage

Standard for Fur Storage, Fumigation and Cleaning, NFPA 81: Protection standard for fur storage vaults and fur cleaning plants.

General Storage, NFPA 231: Applies to storage of materials representing the broad range of combustibles 30 feet or less in height in buildings protected by automatic sprinklers.

Standard for Rack Storage of Materials, NFPA 231C: Applies to storage of materials representing the broad range of combustibles stored over 12 feet in height on racks.

Standard for the Protection of Records, NFPA 232: Covers minimum requirements for records protection equipment and records handling techniques that provide protection from hazards of fire.

Manual for Fire Protection for Archives and Record Centers, NFPA 232AM: Guidance on protection for file rooms of 50,000 cubic feet in volume to largest known archives or record centers.

Recommended Safe Practices for Storage of Forest Products, NFPA 46: Recommends steps to minimize hazards and control fire in storage areas containing lumber, timber, wood chips, logs, and similar products at industrial sites, major storage facilities and retail or wholesale yards.

Standard for Storage of Rubber Tires, NFPA 231D: Covers the storage of rubber tires when stored indoors.

Water Cooling Towers

Water Cooling Towers, NFPA 214: Covers fire protection considerations for field-erected water cooling towers.

Water Extinguishing Systems

Sprinkler Systems, NFPA 13: Covers minimum requirements for the installation of sprinkler systems for fire protection in buildings and the character and adequacy of water supplies to sprinkler systems.

Care and Maintenance of Sprinkler Systems, NFPA 13A: Covers the care and maintenance of sprinkler systems.

Sprinkler Systems for One- and Two-Family Dwellings and Mobile Homes, NFPA 13D: Covers the design and installation of automatic sprinkler systems for one- and two-family dwellings and mobile homes.

Installation of Closed-Head Foam-Water Sprinkler Systems, NFPA 16A: Recommended practice for the design, installation and maintenance of closed-head foam-water systems using standard sprinkler systems.

Centrifugal Fire Pumps, NFPA 20: Covers minimum requirements for centrifugal fire pumps, including single stage and multistage pumps of horizontal or vertical shaft design and the design, installation and maintenance of these pumps, pump drivers and associated equipment.

Operation and Maintenance of Steam Fire Pumps, NFPA 21: Applies to National Standard steam fire pumps.

Standard for the Installation of Deluge Foam-Water Sprinkler Systems and Foam-Water Spray Systems, NFPA 16: Covers minimum requirements for the installation of foam-water sprinkler systems.

Installation of Private Fire Service Mains and Their Appurtenances, NFPA 24: Details of yard piping supplying automatic sprinkler systems, yard hydrants, standpipes, etc.

Supervision of Valves Controlling Water Supplies for Fire Protection, NFPA 26: Recommended practices for identification, supervision, valve seals and tags, valve index boards.

Fire Flow Testing and Marking of Hydrants, NFPA 291: Recommended testing procedure, classification and color coding.

Standpipe and Hose Systems, NFPA 14: Covers minimum requirements for the installation of standpipe and hose systems for buildings and structures.

Water Spray Fixed Systems for Fire Protection, NFPA 15: Covers the design, installation, maintenance and testing of water spray fixed systems.

Water Tanks, NFPA 22: Covers requirements for the design, construction, installation and maintenance of tanks and accessory equipment supplying water for private fire protection.

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Federal Regulations That Reference NFPA Standards

This list shows the extent to which NFPA standards become part of federal regulatory law and, thus, constitute legal obligations. These obligations appear in a number of ways: some are outright mandates (e.g., OSHA rules) while others serve as compliance criteria that condition the receipt of a federal benefit (e.g., HHS/HCFA).

In addition to regulatory use of NFPA standards by the agencies listed, the General Services Administration, the State Department, the Secret Service, and all the military departments utilize the *National Fire Codes®* for purposes of government real property management and may condition leasing of private property for government purposes by compliance, e.g., with provisions of the *Life Safety Code®*. This, however, is not regulatory use. Similarly, the Nuclear Regulatory Commission references a number of NFPA standards in its "Regulatory Guides." These, however, do not have the force of law; they merely present an option for compliance. The Department of Agriculture, U.S. Forest Service, also utilizes NFPA standards for purposes of forest firesafety management. Again, this does not constitute regulatory use.

Titles for standards are listed following the federal regulations listings of NFPA adoptions.

10 CFR Chapter II

Department of Energy
Residential Energy Conservation Program

NFPA Standard Number	CFR Number
NFPA 31-1978	456.905
	.906
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	.909
	.913
NFPA 54.1974 (Part I)	456.905
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	.907
	.909
	.914
NFPA 70-1978	456.914
	.705
NFPA 211-1977	456.905
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	.912

24 CFR Subtitle B, Chapter II

Department of Housing and Urban Development: Federal Housing Commissioner
Minimum Property Standards (MPS)

NFPA Standard Number	CFR Number
NFPA 10-1978	200-299
NFPA 13-1975	"
NFPA 14-1978	"
NFPA 31-1978	"
NFPA 54-1980	"
NFPA 58-1979	"
NFPA 70-1981	"
NFPA 72A-1979	"
NFPA 72B-1979	"
NFPA 72C-1975	"
NFPA 72D-1979	"
NFPA 72E-1978	"
NFPA 80-1977	"
NFPA 82-1977	"
NFPA 90A-1976	"
NFPA 90B-1980	"
NFPA 101-1976	"
NFPA 211-1980	"
NFPA 252-1979	"
NFPA 253-1978	"
NFPA 701-1977	"

Intermediate MPS for Solar Heating and Domestic Hot Water Systems

NFPA Standard Number	CFR Number
NFPA 30-1978	200-299
NFPA 89M-1976	"
NFPA 321-1976	"

24 CFR Chapter XX

Department of Housing and Urban Development: Office for Neighborhoods, Voluntary Associations and Consumer Protection
Mobile Home Standards

NFPA Standard Number	CFR Number
NFPA 31-1974	3280.703
NFPA 54-1974	3280.703
NFPA 58-1974	3280.703
	3280.704(b)(5)
NFPA 70-1975	3280.801(b)
	3280.808(a)
NFPA90B-1973	3280.703

29 CFR Chapter XVII

Department of Labor: Occupational Safety and Health Administration
Part 1910

NFPA Standard Number	CFR Number
NFPA 30-1969	1910.178
NFPA 32-1970	1910.106
NFPA 33-1969	1910.94
NFPA 34-1966	1910.94
NFPA 35-1970	1910.106
NFPA 36-1967	1910.106
NFPA 37-1970	1910.106
	.110
NFPA 51B-1962	1910.252
NFPA 54-1969	1910.110
NFPA 54A-1969	1910.110
NFPA 58-1969	1910.168
	.178
NFPA 59-1968	1910.110
NFPA 62-1967	1910.263
NFPA 68-1954	1910.94
NFPA 70-1971	1910.66
	.68
	.94
	.103
	.178
NFPA 78-1968	1910.109
NFPA 80-1968	1910.106
NFPA 80-1970	1910.252
NFPA 86A-1969	1910.107
	.108
NFPA 91-1961	1910.107
NFPA 91-1969	1910.108
NFPA 96-1970	1910.110
NFPA 101-1970	1910.261
NFPA 203M-1970	1910.109
NFPA 251-1969	1910.106
NFPA 302-1968	1910.265
NFPA 385-1966	1910.106
NFPA 496-1967	1910.103

NFPA Standard Number	CFR Number
NFPA 505-1969	1910.110
	.189
NFPA 566-1965	1910.252
NFPA 656-1959	1910.263
Part 1926	
NFPA 10A-1970	1926.150
NFPA 13-1969	1926.152
NFPA 30-1969 (Ch. III and IV only)	1926.152
NFPA 70-1971	1926.151
	.351
	.400
	.401
	.404
	.803
NFPA 80-1969	1926.152
NFPA 385-1966	1926.152

30 CFR Chapter I

Department of Labor: Mine Safety and Health Administration

NFPA Standard Number	CFR Number
NFPA 11A-1970	75.1107-16
NFPA 13-1969	75.1101-7
NFPA 13A-1971	75.1107-16
NFPA 15-1969	75.1107-16
NFPA 17-1969	75.1107-16
NFPA 22-1971	75.1107-3; 75.1107-13
NFPA 30-1969	57.4-4
	77.1103
NFPA 60-1961	77.301
NFPA 70-1968	55.12-45
	55.12-48
	56.12-45
	56.12-48
	57.12-45
	57.12-48
	75.513-1
	75.518-1
	77.301-1
	77.503-1
	77.506-1
	77.516
	77.901
NFPA 72A-1967	75.1103-2
	75.1107-4
	75.1107-16
NFPA 198-1969	75.1107-16
NFPA 252-1972	57.2

33 CFR Chapter I

Department of Transportation: Coast Guard

NFPA Standard Number	CFR Number
NFPA 11A-1976	149.481
NFPA 12-1977	149.481
NFPA 12A-1977	149.481
NFPA 13-1978	149.481
NFPA 70-1981 (Articles 310 and 400)	183.435
NFPA 72A-1975	149.541
NFPA 407-1975 (Chapter 6)	149.213

33 CFR Chapter II

Department of the Army: Corps of Engineers

NFPA Standard Number	CFR Number
NFPA 70-1981	222.5

38 CFR Chapter I

Veterans Administration: (Adoption via Hud Minimum Property Standards)

NFPA Standard Number	CFR Number
NFPA 10-1978	36.4360
NFPA 13-1975	"
NFPA 14-1978	"
NFPA 31-1978	"
NFPA 54-1980	"
NFPA 58-1979	"
NFPA 70-1981	"
NFPA 72A-1979	"
NFPA 72B-1979	"
NFPA 72C-1975	"
NFPA 72D-1979	"
NFPA 72E-1978	"
NFPA 80-1977	"
NFPA 82-1977	"
NFPA 90A-1978	"
NFPA 90B-1980	"
NFPA 101-1976	"
NFPA 211-1980	"
NFPA 252-1979	"
NFPA 253-1978	"
NFPA 701-1977	"

40 CFR Chapter 1

Environmental Protection Agency

NFPA Standard Number	CFR Number
NFPA 30-1981	264.198(b) 265.198(b)

42 CFR Chapter I

Department of Health and Human Services: Public Health Services

NFPA Standard Number	CFR Number
NFPA 56F-1977	52b.11(b)(3)
NFPA 70-1981	Part 36, Subpart H, App. A(e) 52b.11(e)

NFPA Standard Number	CFR Number
NFPA 101-1976	Part 36, Subpart H, App. A(c), 51c.503 (a)(7)(iii)(B)-52b.11(c); 52b.11(d)
42 CFR Chapter IV	
Health Care Financing Administration	
NFPA 101-1981	405.1022(b); 405.1134(a); 442.321(a); 442.507
NFPA 220-1979	442.323(b)(1); 442.509
45 CFR Chapter XIII	
Department of Health and Human Services: Office of Human Development Services	
NFPA 101-1976	1321.133(b) 1328.35(b)
46 CFR Subchapter D	
Department of Transportation: Coast Guard	
NFPA 306-1975	35.01-1
Subchapter F	
NFPA 70-1981	63.05-85 63.10-85
NFPA 302-1980 Part I, Sec. 23 only	58.10-5
Subchapter H	
NFPA 56A-1973	72.05-10
NFPA 306-1980	71.60-1
49 CFR Chapter I	
Department of Transportation: Research and Special Programs Administration	
Hazardous Materials Regulations	
NFPA 58-1972	71.7; 173.315
Pipeline Safety Regulations	
NFPA 30-1977	192.735 193.2149 193.2813

NFPA Standard Number	CFR Number
NFPA 37-1979	193.2147
NFPA 51B-1977	193.2811
NFPA 58-1979	192.11
NFPA 59-1979	192.11
NFPA 59A-1972	193.2005
NFPA 59A-1979	193.2073 193.2141 193.2213 193.2819 193.2821
NFPA 70-1978	192.163 192.167 193.2141 193.2427 193.2433 193.2805
Subchapter R	
NFPA 306-1980	167.30-1
Subchapter T	
NFPA 70-1981	183.01-10 183.05-45 183.05-50 183.10-20
Subchapter U	
NFPA 306-1975	189.50-1
Subchapter I	
NFPA 306-1980	91.50-1
Subchapter I-A	
NFPA 306-1980	109.573
NFPA 407-1980	108.239
NFPA 496-1974	108.187
Subchapter J	
NFPA 56A-1973	110.10-1; 111.80-20
NFPA 70-1981	110.10-1; 111.50-15; 111.80-5
Subchapter N	
NFPA 57-1973	147A.11
NFPA 70-1981	146.29-35
Subchapter O	
NFPA 255-1972	164.012-1

ABBREVIATED TITLES FOR STANDARDS

10	Fire Extinguishers, Portable
11A	Foam Systems, High Expansion
12	Carbon Dioxide Extinguishing Systems
12A	Halon 1301 Fire Extinguishing Systems
13	Sprinkler Systems, Installation
13A	Sprinkler Systems, Care, Maintenance
14	Standpipe and Hose Systems
15	Water Spray Fixed Systems
17	Dry Chemical Extinguishing Systems
22	Water Tanks for Private Fire Protection
30	Flammable and Combustible Liquids Code
31	Oil Burning Equipment, Installation of
32	Drycleaning Plants
33	Spray Application Using Flam & Combust Mat
34	Dipping and Coating Processes Using Flammable or Combustible
35	Organic Coatings, Manufacture of
36	Solvent Extraction Plants
37	Combustion Engines and Gas Turbines
51B	Cutting and Welding Processes, Usage of
54	Fuel Gas Code, National
56A	Inhalation Anesthetics
56F	Gas Systems, Nonflammable Medical
57	Fumigation
58	Liquefied Petroleum Gases, Storage and Handling
59	Liquefied Petroleum Gases at Utility Gas Plants
59A	Liquefied Natural Gas, Storage and Handling
60	Pulverized Coal Systems
62	Pulverizing Cocoa and Sugar
68	Explosion Venting
70	Electrical Code, National
72A	Signaling Systems, Local Protective
72B	Signaling Systems, Auxiliary Protective
72C	Signaling Systems, Remote Station Protective
72D	Signaling Systems, Proprietary Protective
72E	Fire Detectors, Automatic
78	Lightning Protection Code
80	Fire Doors and Windows
82	Incinerators, Waste and Linen Handling Systems and Equipment
86A	Ovens and Furnaces, Design, Location and Equipment
89M	Heat Producing Appliances, Clearances for
90A	Air Conditioning and Ventilating Systems
90B	Warm Air Heating and Air Conditioning Systems
91	Blower and Exhaust Systems, Dust, Stock, Vapor
96	Cooking Equipment, Vapor Removal from
101	Life Safety Code
198	Care of Fire Hose
203M	Roof Coverings
211	Chimneys, Vents, Fireplaces, and Solid Fuel Burning Appliances
220	Building Construction, Standard Types of
251	Building Construction and Materials, Fire Tests of
252	Door Assemblies, Fire Tests of
253	Floor Covering Systems, Critical Radiant Flux Test for
255	Building Materials, Test of Surface Burning Characteristics
302	Motor Craft
306	Vessels, Control of Gas Hazards on
321	Flammable and Combustible Liquids, Classification of
385	Flammable and Combustible Liquids, Tank Vehicles for
407	Aircraft Fuel Servicing
496	Electrical Equipment, Purged and Pressurized Enclosures for
505	Industrial Trucks, Powered
566	Bulk Systems of Oxygen
656	Prevention of Dust Ignitions in Spice Grinding Plants
701	Textiles and Films, Flame Resistant Tests for

National Fire Protection Association

An Overview

The National Fire Protection Association (NFPA), organized in 1896, has as its mission the safeguarding of man and his environment from destructive fire, using scientific and engineering techniques and education. Incorporated in 1930 under laws of the Commonwealth of Massachusetts, the Association has its headquarters in Quincy, Massachusetts.

NFPA is an independent, voluntary membership, nonprofit (tax-exempt) organization. A 28-member Board of Directors has general charge of the affairs of the Association, which has a staff of some 120 professional men and women plus a slightly smaller number of support personnel.

NFPA is financed principally by membership dues, sales of its publications and audiovisual materials, income from seminars, research grants, and contributions.

Membership in NFPA totals approximately 32,000 individuals and 150 national trade and professional organizations from more than 85 nations. Members are drawn from fire departments (24 percent), business and industry (18 percent), health care facilities (17 percent), insurance (10 percent), architects and engineers (7 percent), federal, state, and local government (6 percent), fire equipment manufacturers and distributors (5 percent), educational facilities (3 percent), trade and professional associations (2 percent), and other fields (8 percent).

Membership

Membership in the National Fire Protection Association is open to everyone who wishes to share in the NFPA goal of improving the level of firesafety in all phases of modern life. Both voting and non-voting memberships are available.

The annual membership dues are $50.00 per person and include a subscription to the bimonthly magazine *Fire Journal*® and to the newsletter *Fire News*. These two periodicals are available only to members of the Association; they are not sold on an individual subscription basis. In addition, members are entitled to reduced rates for the monthly magazine *Fire Service Today*®, the quarterly publication *Fire Technology*, and the Standards Information Service. The annual *Fire Protection Reference Directory*, at $10.00 per copy, is available to NPFA members without charge. All print, film, and audiovisual products are offered to members at a discount off the regular list price.

Section Membership Each NFPA member is entitled to join one of the eleven membership Sections free of charge; there is a small additional fee for anyone wishing to join more than one Section. Sections have their own officers, meetings, and newsletters, and serve as forums for the exchange of information on specific fire protection problems and interests. The eleven Sections and their officers are listed later in this section.

Codes and Standards NFPA Codes and Standards are developed by approximately 175 Technical Committees comprised of some 2,400 experts who serve voluntarily, representing a balance of interests. Members have an opportunity to take part in this democratic process by voting on the documents developed, revised, updated, and otherwise prepared by the Technical Committees. Together, NFPA codes and standards comprise the *National Fire Codes®*, published annually, and each document is also available in a separate booklet edition. A booklet detailing NFPA membership services and benefits is available on request from the NFPA Membership and Subscriptions Department, Batterymarch Park, Quincy, MA 02269; (617) 328-9290.

Voting Voting on NFPA codes and standards is limited to current, paid-up members of NFPA. Members must join the Association at least 180 days prior to the opening of any regular meeting to be eligible to vote at that meeting. Voting occurs twice a year, at the NFPA Annual Meeting in May and the Fall Meeting in November. Votes apply to each new code and standard; to revisions of existing documents; and to withdrawal or reconfirmation of existing documents.

Meetings

The four-day NFPA Annual Meeting and Fire Safety Exhibit is held in May, with an average attendance of 6,000 persons. The Fall Meeting, which also lasts four days and attracts some 1,200 persons, occurs each November. Meetings are held in varying locations throughout the United States; some take place in Canada; and one, thus far, has been in Europe. Lectures, discussions, voting on technical documents, NFPA Section meetings, conduct of other Association business, and special events make up the meeting programs. Registration is open to all who are interested, although only voting members may vote.

Activities

Activities of NFPA generally fall into two broad, interrelated areas: technical and educational. The basic technical activity involves development, publication, and dissemination of timely consensus standards intended to minimize the possibility and effects of fire in all aspects of contemporary life. Efforts are also directed to educate the general public of all ages to avoid loss of life and property from fire by abiding by the standards and by making good firesafety habits a way of life.

Technical

After adopted by the NFPA membership at either an Annual or a Fall Meeting, and issued by the Standards Council, standards are published and made available for voluntary adoption. The standards have great influence because they are widely used as the basis of legislation and regulation at all levels of government, from local to national. Many are referenced by agencies of the federal government (see the section on Standards) such as in the regulations of the Occupational Safety and Health Administration (OSHA); the documents also are used by insurance authorities for risk evaluation and premium rating.

Technical advisory services are provided on both a formal and informal basis to anyone legitimately concerned with fire-related problems. Within the Engineering Services Division are four special Field Services, each established to provide guidance in the application of pertinent standards. These Field Services are: Electrical, Flammable Gases, Flammable Liquids, and Marine. Through its Marine Chemist Qualification Board, the Association administers the NFPA Certificated Marine Chemist program. Technical staff members of the Division also serve as instructors, lecturers, and panelists on a variety of firesafety programs of organizations based all over the globe.

Similarly, the Public Protection Division provides information resources to the fire service. Staff members advise individual fire departments on application of NFPA standards pertaining to the fire service, and take part in training programs and conferences for fire department personnel throughout North America and abroad.

The Association's technical and general interest publications program ranges across the fire protection spectrum. In addition to publishing its own standards and codes, NFPA also publishes handbooks, reference books, textbooks, training manuals, audiovisual packages, and films.

As the nation's independent center of fire information, NFPA maintains the Charles S. Morgan Technical Library. This up-to-date reference collection includes books (4,700), technical reports (11,000), periodicals (440 titles), standards and pamphlets (20,000), topical files (4,000), items in microfilm (10,500) and various audiovisual materials.

The Association maintains offices in Washington, DC, for close liaison with agencies of the federal government, as well as with NFPA's Washington-based organization members. Administrators and other staff of the Association frequently are asked to present expert testimony before Congressional committees and at other federal hearings. Through its Washington-based International Division, NFPA also provides liaison and assistance to the world community and to the Association's members in more than 85 countries outside the U.S.

Educational

"Learn Not to Burn®" is the theme and focus of NFPA's broad public firesafety education program, which includes a national media campaign, a firesafety curriculum for school children, and an extensive outreach program supported by a regional field network of NFPA representatives. (See the article on "Learn Not to Burn" in this section.) NFPA serves as the national sponsor of Fire Prevention Week each October. The Association also produces posters, booklets, flyers and children's items that teach personal, home, and on-the-job firesafety. For more than 30 years, Sparky the Fire Dog has appeared in many of the materials produced for children.

Through its Continuing Education Division, NFPA conducts seminars on fire-related problems and solutions. These seminars concern interpretation and application of codes and standards, plus application of state-of-the-art fire protection technology to any fire-related area. Current seminars support the *Life Safety Code®* (NFPA *101®*) and the *National Electrical Code®* (NFPA 70) and present state-of-the-art fire protection technology in the areas of detention and correctional occupancies, hotels/motels, and shipyards.

Executive Management

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Nicholas J. Zaffiro, Ass't. Vice President (Purchasing & Administration)

WE WANT TO KNOW . . .

if a name, an address, or a phone number has changed; if there's an upcoming event, a new program or course, a new publication being offered. If you have more current information than is contained in this *Almanac*, know something that should be included in this book, or just have something interesting about the fire protection scene that you want to contribute, please let us know. Write: Editor, *Fire Almanac*, NFPA, Batterymarch Park, Quincy, MA 02269. All suggestions will receive our careful attention.

Got a Question?

The following list will help direct you to the appropriate NFPA department or staff person when you contact the NFPA with a question or request. Mailing address: NFPA, Batterymarch Park, Quincy, MA 02269. Telephone: (617) 328-9290.

Advertising: Denise Babcock, Manager

Customer Service (NFPA Publications): Paul Carey, Manager
Phone orders, requests, or order problems 617/328-9230(direct line)

Education Programs: Judith Comoletti, Secretary
Learn Not To Burn Curriculum, network, etc.

Film and Audiovisuals: Jean Dellapi, Secretary
Films in production

Fire Data: Jon Jones, Manager, Fire Data Services

Fire Journal: Pamela Powell, Editor
Bi-monthly member magazine

Fire News: Catherine G. Cronin, Editor
Member newsletter, 8 times per year

Fire Service Today: Joyce Keefe, Editor
Monthly magazine for the fire service

Fire Technology: Mattie Headd, Ass't. Ed.
Quarterly publication for technical articles, reports on the fire field.

International Operations: NFPA Washington Office, 202/484-8200

Legal questions: Dennis Berry, Associate General Counsel
Copyrights, product permission, etc.

Library Services: Dorinda Fergason, Fire Information Specialist

Annual and Fall Meeting Programs: Cassandra Goldwater, Engineering Assistant
Program content

Meetings and Seminars: Rebecca Bumsted, Seminar Registrar
Meeting information and seminar registration

Membership: Barbara Evans, Manager
Questions on delivery of member and subscription periodicals, member dues, section verification, etc.

Public Affairs: Sherri Pitts, Secretary
Public information/media relations

Publication Orders: 617/328-9230(direct line)

Standards System Administration: Leona Taraskiewicz, Coordinator
Non-technical questions

Washington Operations: Letitia Kellerlane, Secretary. (202) 484-8200
For government actions related to the NFPA

Fire Service-Related Questions

Fire fighter qualifications
Fire Prevention Code
Rural fire protection

Robert C. Barr, Division Director
Public Protection Division

Arson investigation
Fire inspector and fire investigator qualifications
Fire investigation
Investigation of fires of electrical origin

Robert E. Carter

Fire service instructor qualification
Fire service officer qualifications
Fire service training
Liaison with other fire service training organizations and advisory services

James V. McKiernan

Fire department organization
Fire protection educators accreditation
Fire reporting
Firesafety symbols
Fire service management systems, including UFIRS and FIRS systems

Carl E. Peterson

Liaison with fire service organizations and government agencies

Joseph M. Redden, Ass't. Vice President, Public Protection Division

Aviation fire protection (aircraft fueling and maintenance, aircraft rescue and fire fighting airport facilities)
Fire department equipment and apparatus
Occupational safety and health in the fire service
Protective equipment for fire fighters

Bruce W. Teele

Technical Questions about Fire Protection

Boilers and furnaces
Fossil fueled steam electric generating stations
Hydroelectric stations
Industrial trucks
Mines
Nuclear energy
Ovens and furnaces
Rapid transit systems
Waste water treatment facilities
Water cooling towers

John Anderson

Chemicals
Combustible metals
Explosion protection
Explosives
Fireworks
Industrial loss prevention
Plastics
Pyrotechnics

Robert Benedetti

Air conditioning
Building construction
Fire doors and windows
Incinerators, waste and linen handling
Solid fuel heating appliances
Vapor removal from commercial cooking equipment

John Bouchard

Electricity
National Electrical Code®, NFPA 70

John Caloggero
Peter Schram
Joe Tedesco

Fire tests
Life Safety Code®, NFPA 101®

Ronald Cote

Flammable liquids

Martin Henry

Extinguishing systems (water, foam)
Fire pumps
Foam systems
Forest products
Fur storage
General storage
Rack storage
Record protection
Rubber tires
Standpipe systems
Underground piping
Water sprays
Water tanks

Robert Hodnett

Marine

Charles Keller

Health care facilities

Burton Klein

Life Safety Code®, NFPA 101®
Parking garages
Repair garages

James Lathrop

Gases

Wilbur Walls

Detectors
Electronic computers
Emergency power supplies
Extinguishing systems (halon, dry chemical, CO_2)
Libraries, museums, historic buildings
Lightning protection
Mobile homes, RVs, dwellings
Portable extinguishers
Signal systems and fire detectors

Charles Zimmerman

NFPA Membership Sections

Within the Voting Membership are 11 Sections. Oldest is the Fire Marshals Association of North America, founded in 1906 and reorganized in 1927 as the Fire Marshals Section of NFPA. Other Sections, in order of their founding, are Electrical (1948), Railroad (1963), Industrial Fire Protection (1963), Fire Service (1973), Chief Electrical Inspectors (founded in 1974 as the National Association of Chief Electrical Inspectors), Health Care (1976), Fire Science and Technology Educators (1976), Aviation (1980), and Education (1981).

All NFPA Sections, except the Fire Marshals Section, are based at NFPA Headquarters, Batterymarch Park, Quincy, MA 02269; (617) 328-9290. The Fire Marshals Section is based in the NFPA Washington Office, Capital Gallery Suite 220, 600 Maryland Ave. SW, Washington, DC 20024; (202) 484-8200. The sections with their respective executive officers and secretaries (all secretaries are full-time NFPA staff) are listed here.

Architects, Engineers and Building Code Officials Section

Chairman: Elliott S. Guttman
Vice President/Facilities Engineering & Construction, Catherine McAuley Health Ctr., P.O. Box 992, Ann Arbor, MI 48106

Vice Chairman: Thomas Horty
President, Horty Elving & Assoc. Inc., 505 E. Grant St., Minneapolis, MN 55404

Secretary: Hugo Heyns
AIA Chief Architect, Dept. of Public Safety Office of the State Fire Marshal, 9131 Interline Ave., Bldg C, Baton Rouge, LA 70809

Executive Secretary: John R. Anderson
National Fire Protection Assn., Batterymarch Park, Quincy, MA 02269 (617) 328-9290

Aviation Section

Chairman: James J. Brenneman
United Airlines Inc., San Francisco Intl. Airport, San Francisco, CA 94128

Vice Chairman: Charles Averill
Manager, Grinnell Fire Protection Systems Co., 10 Dorrance St., Providence, RI 02903

Secretary: Calvin E. Smith
Pan American World Airways, Teterboro Airport, Teterboro, NJ 07608

Executive Secretary: Robert C. Barr
National Fire Protection Assn., Batterymarch Park, Quincy, MA 02269 (617) 328-9290

Chief Electrical Inspectors' Section (National Association of Chief Electrical Inspectors)

President: Herb Bowling
1306 Gay St., Nashville, TN 37201

First Vice-President: Roger A. Niedermeyer
Electrical Div., City Hall, Rm. 111, 1220 SW Fifth Ave., Portland, OR 97204

Second Vice-President: Clarence B. Joriman
State Board of Electricity, 1821 University Ave., Rm. N191, St. Paul, MN 55105

Secretary: T. H. Haltom Jr.
Chief Electrical Inspector, City of Westover, 4600 Panola, Fort Worth, TX 76103

Executive Secretary: Peter J. Schram
National Fire Protection Assn., Batterymarch Park, Quincy, MA 02269 (617) 328-9290

Education Section

Chairman: Stephen A. Jensen
Phoenix Fire Dept., 620 W. Washington Phoenix, AZ 85003

Vice-Chairman: Hugh Graham
Fire Service Training, Oklahoma State University, Stillwater, OK 74078

Secretary: Meredith K. Appy
Factory Mutual Engineering, 1151 Bos-

ton-Providence Turnpike, Norwood, MA 02062

Executive Secretary: Corinne Broderick
National Fire Protection Assn., Batterymarch Park, Quincy, MA 02269 (617) 328-9290

Electrical Section

Chairman: Richard G. Biermann
Biermann Electric Co. Inc., 2300 University Ave., Des Moines, IA 50311

Secretary: Peter J. Schram
National Fire Protection Assn., Batterymarch Park, Quincy, MA 02269 (617) 328-9290

Fire Marshals Section

(See separate listing under Fire Marshals Association of North America, Joint Council of National Fire Service Organizations.)

Fire Science and Technology Educators Section

Chairman: Dr. Larry G. McDougle
Director, Baccul. Degree Programs, School of Technical Careers, Southern Illinois University, Carbondale, IL 62901

Vice-Chairman: Dr. Fred C. Sutton
Assistant Dean of Career Technology, Cuyahoga Community College Metro Campus, Cleveland, OH 44115

Secretary: John A. Campbell
Gage-Babcock & Associates, 1135 Fairview, Lombard, IL 60148

Executive Secretary: Carl E. Peterson
National Fire Protection Assn., Batterymarch Park Quincy, MA 02269 (617) 328-9290

Fire Service Section

Chairman: Richard A. Moncur
Captain, Westfield Fire Dept., 115 Grove St., Westfield, NJ 07090

Vice-Chairman: Vincent J. Bollon
Lieutenant, Fire Dept. New York, Suite 900, 225 Broadway, New York, NY 10007

Secretary: James M. Turner
Battalion Chief, LA County Fire Dept., 24875 N. San Fernando Rd., Newhall, CA 91321

Executive Secretary: James V. McKiernan
National Fire Protection Assn., Batterymarch Park, Quincy, MA 02269 (617) 328-9290

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Vice-Chairman: Ernest F. Bernhauser
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Secretary: Charles E. Zimmerman
National Fire Protection Assn., Batterymarch Park, Quincy, MA 02269 (617) 328-9290

Learn Not to Burn®

Learn Not to Burn® serves as the credo for NFPA's extensive public education and awareness efforts that reach millions of people around the world each year. During the course of more than 85 years of firesafety research, investigation, and advocacy, the Association has been concerned that death and loss from fire continue to happen despite the best efforts at rectifying structural causes through codes and standards. It is clear that only by educating people to recognize the hazards in their everyday lives and to respond properly in emergencies can we hope to save lives and property from destruction by fire. To help achieve this goal, NFPA created the Learn Not to Burn program as a way to educate large numbers of people using a variety of formats to teach actions they could take as individuals to prevent fires and to protect themselves in fire situations.

National Media Campaign

An important and widely recognized aspect of the program is the national media campaign that uses television, radio, and print messages to teach people how to Learn Not to Burn.

In studies conducted on behalf of NFPA, it was recommended that these messages stress information and repetition rather than impression. People did not want to be preached to; rather, they wanted to be taught firesafety information through short, concise messages.

In 1975, the Public Service Council began coordinating NFPA's Learn Not to Burn television firesafety campaign. The Council distributes firesafety spots through a network of field contacts who have the responsibility for placing them with the local media. The local television station airs the spots free-of-charge as a public service to its viewing audience.

Nineteen television public service announcements have been produced featuring actor Dick Van Dyke. These short, 30 second spots stress the positive behavioral approach to take when faced with a fire situation. They tell people *what to do*, rather than what not to do.

During 1982, the total number of lives saved as a result of the firesafety lessons learned from these television messages reached 59. They were not only from within the United States. A mother from New Zealand saved the life of her son when she remembered to crawl low through the smoke filled bedroom to where her son was lying. She recalled this lifesaving message from watching Dick Van Dyke on television.

In addition to television, NFPA's radio messages have been aimed at specific target audiences. Actor Vincent Price, former chairman of the U.S. Department of Interior's Indian Arts and Crafts Board, recorded five radio spots to help combat the severe fire problem in American Indian communities. Also, several leading black celebrities and entertainers have recorded messages that address fire problems of the inner city resident.

All-Media Kit

A new and successful strategy to support the Learn Not to Burn Campaign is the all-media kit developed in 1982. Based upon a single firesafety behavior, the campaign kit includes print ads and radio messages to reinforce the particular television spot. The first kit was released in August 1982 and covered the Stop, Drop, and Roll message. When used within the community, the kits promote a total firesafety awareness campaign based upon the Learn Not to Burn message.

Learn Not to Burn Curriculum

Another major component of the Learn Not to Burn program is a firesafety curriculum for use at the elementary school level. The Learn Not to Burn Curriculum is currently in use in some 25,000 classrooms nationwide. Among the major areas now using the program are Memphis, Phoenix, Fort Worth, Houston, San Francisco, San Diego, and Nassau County, New York. The Learn Not to Burn Curriculum is also a part of the school program in areas throughout the states of Alaska, New York, and Oklahoma.

NFPA developed the Curriculum based upon the results of a comprehensive study of firesafety education. The study revealed that while individual states, communities, and some national organizations have attempted to create fire prevention curricula, there was little coordination between fire departments and school districts; almost no coherent continuity in firesafety education from grade to grade; extremely uneven participation by school personnel in the fire education process, and in regard to the curricula themselves, an absence of educational objectives and relationship to other elements of the school program.

The Learn Not to Burn Curriculum was released after four years of vigorous development and field testing. The testing process involved more than 4,700 students in experimental/control settings in seven locations across the country.

Firesafety Behaviors

The Curriculum focuses on 25 firesafety behaviors deemed necessary to fulfill the basic goals of:

Protection of the individual and others from fire;
Protection of fire; and
Persuasion or motivation of individuals to practic firesafety.

Each behavioral objective is organized in such a way as to involve:

the action components including skills and practices;
the cognitive aspects involving knowledge and understanding;
the affective components consisting of attitudes, beliefs, and values.

The 25 key firesafety behaviors are integrated into regular subject areas of the classroom. There is a card for each behavior that suggests participatory, affirming activities within the subjects normally taught at that grade level such as mathematics, science, language arts, etc. Although the same 25 behaviors are taught year after year, they increase in complexity as the child matures. To assist teachers, there are three levels of instruction outlined. Level I applies to kindergarten-grade 2; Level II to grades 3-5; Level III to grades 6-8. The notebook for each level contains lesson plans, illustrations, firesafety background information, evaluation instruments, and an extensive reference guide to supplementary materials.

LNTB Network

A network of regional field representatives was organized in 1982 to assist in the implementation of the Learn Not to Burn Curriculum throughout the United States. These representatives work within specific geographic regions to provide technical assistance to users and potential users of the program. They also conduct informational workshops for the fire service, educators, and community leaders, as well as in-service training for teachers using the program.

All regional representatives have extensive backgrounds in fire and burn safety and are among the leading advocates of promoting education as a means to a more firesafe environment. Listed below are the Regional Representatives.

REGION 1 (Nevada, California, Hawaii)
Jan Gratton
469 S. Albertson Ave.
Covina, CA 91723
(213) 331-8792

REGION 2 (Alaska, Montana, Idaho, Oregon, Washington)
Ron Mehlert
14116 65th, W.
Edmonds, WA 98020
(206) 743-1748

REGION 3 (Kansas, Nebraska, Oklahoma, Colorado, Utah, Wyoming)
Hugh Graham
Fire Service Training
Fire Building
Oklahoma State University
Stillwater, OK 74078
(405) 624-5727
(405) 889-7146

REGION 4 (Texas, Arizona, New Mexico)
Carol Gross
Phoenix Fire Dept.
620 W Washington St.
Phoenix, AZ 85003
(602) 262-6002

REGION 5 (North Carolina, South Carolina, Georgia, Florida, Alabama, Louisiana, Arkansas, Tennessee, Mississippi)
Cathy Lohr
Fire Education Specialist
& Rescue Services Div.
Dept. of Insurance
Box 26387
Raleigh, NC 27611
(919) 733-2142

REGION 6 (Michigan, Wisconsin, Minnesota, South Dakota, North Dakota, Iowa)
Craig Herling
Madison Fire Dept.
325 W. Johnson St.
Madison, WI 53703
(608) 266-4420

REGION 7 (Kentucky, Ohio, Indiana, Illinois, Missouri)
Pat Mieszala
Burn Concerns
4218 N. Pulaski Rd.
Chicago, IL 60641
(312) 283-4112

REGION 8 (Maryland, Virginia, West Virginia, Pennsylvania, Delaware)
Edi Maletsky
Educational Coordinator
879 Tryens Rd.
Aston, PA 19014
(215) 459-5710

REGION 9 (Connecticut, New Jersey, New York)
Bill Porter
William Porter Associates
551 Litchfield Turnpike
Bethany, CT 06525
(203) 393-3706

REGION 10 (Massachusetts, Rhode Island, New Hampshire, Maine, Vermont)
Teresa Smalley
7 Jackson Rd.
Scituate, MA 02066
(617) 545-1664

Hazardous Materials

Hazardous Materials Definitions

Department of Transportation Definitions

Hazardous materials are regulated by the U.S. Department of Transportation (DOT). DOT specifically identifies the hazardous materials and publishes regulations that deal with their transportation, placarding, handling, and with recommended emergency response procedures. The regulations include specifications for tank construction. The DOT categorizes hazardous materials into the same classifications used by the United Nations Committee of Experts on the Transport of Dangerous Goods. These classifications are as follows: (See Title 49 of the Code of Federal Regulations for complete definitions.)

Explosive: Any chemical compound, mixture, or device, the primary or common purpose of which is to function by explosion, i.e., with substantially instantaneous release of gas and heat.

Compressed Gas: Any material or mixture having in the container an absolute pressure exceeding 40 psi at 70°F or, regardless of the pressure at 70°F, having an absolute pressure exceeding 104 psi at 130°F, or any liquid flammable material having a vapor pressure exceeding 40 psi absolute at 100°F as determined by ASTM Test O-323.

Flammable Liquid: Any liquid having a flash point below 100°F.

Flammable Solid: Any solid material, other than one classed as an explosive, which, under conditions normally incident to transportation is liable to cause fires through friction, retained heat from manufacturing or processing, or which can be ignited readily and when ignited burns so vigorously and persistently as to create a serious transportation hazard. Included in this class are spontaneously combustible and water-reactive materials.

Oxidizer: A substance such as a chlorate, permanganate, inorganic peroxide, or a nitrate, that yields oxygen readily to stimulate the combustion of organic matter.

Poisons: These are divided into three groups, A, B, and Irritating Material, according to the degree of hazard in transportation. Class A poisons are such that a very small amount mixed with air is dangerous to life; Class B are those known to be so toxic to men as to afford a hazard to health during transportation. Irritating Materials are those substances which, upon contact with fire or when exposed to air, give off dangerous or intensely irritating fumes, but not including any poisonous material Class A.

Corrosives: Substances that cause visible destruction or irreversible alterations in human skin tissue at the site of contact, or in the case of leakage from its packaging, a liquid that has a severe corrosion rate on steel.

Radioactive Materials: See 173.389 of Title 49 for the extensive list of definitions of radioactive materials.

Miscellaneous: These include Other Regulated Material (ORM) specified in Subpart J of Title 49 of the Code of Federal Regulations.

Environmental Protection Agency Definitions

Hazardous Wastes: These are regulated by the United States Environmental Protection Agency (EPA), as a direct result of the 1976 Resource Conservation and Recovery Act (RCRA). The EPA was directed to issue regulations governing hazardous wastes, including their packaging, labeling, and transportation. In addition to transportation, EPA covers generation and disposal, or what is commonly referred to as the "cradle-to-grave" handling of wastes. It is important to note that the Agency has application on both an intrastate and an interstate basis. EPA classifies hazardous wastes according to four characteristics, as follows:

1. *ignitibility*: liquids that have a flash point of less than 140°F; non-liquids likely to cause fires through friction, moisture absorption, spontaneous heating, etc.; ignitible compressed gases; and oxidizers.
2. *corrosivity*: wastes exhibiting a pH of 3 or less and of 12 or more, or wastes that corrode steel at a rate greater than 0.25 inches per year.
3. *reactivity*: wastes that undergo violent chemical change, form explosive mixtures with water, generate toxic fumes when mixed with water, explode when subjected to a strong initiating force, or explode at normal temperatures and pressures.
4. *toxicity*: wastes that cause the contamination of ground water through the leakage of contaminants when land-disposed.

Hazardous Substances

As a group, hazardous substances derives its origins from the 1976 Clean Water Act Amendments that direct the EPA to regulate "oil and hazardous substances." The EPA has a specific list of 299 hazardous substances by name. If a navigable waterway is affected by a spill from any of the listed substances, the person responsible for the spill must cover cleanup costs to a maximum of $50 million per incident.

Hazardous Materials Identification Systems

Department of Transportation Placard and Labeling System

Many people are involved in controlling the transportation and use of hazardous materials. The Transportation Safety Act of 1974, which became effective in 1975, gave new stimulus to hazardous materials regulations although federal regulations had existed for years before this act. The Department of Transportation (DOT) is responsible for regulating the transportation of hazardous materials by air, water, highway, rail, and pipelines. DOT regulations [see *Title 49, Code of Federal Regulations (49 CFR)*] cover every phase of a shipment, including determining which materials may or may not be carried. *Title 49* also contains requirements for training personnel. Regulations hold the manufacturer, shipper, and carrier responsible for training any involved persons in the proper preparation of the materials for transport and for strict adherence to the regulations.

Regulations govern the packaging of hazardous materials for shipment. DOT maintains strict container specifications for transporting hazardous materials. For example, certain materials may only be shipped in hermetically-sealed drums that are manufactured according to DOT standards. These standards include material strength, thickness, fabrication, and container capacity. DOT stipulates that after the hazardous material has been packaged, the individual containers must be labeled. Bulk freight containers or vehicles must be placarded. The regulations specify a standard labeling and placarding system that warns of the presence of hazardous materials.

DOT requires that shipping documents indicate the quantity being shipped, the proper DOT shipping name for the material, the identification number, and the hazard class. Carriers are also required to notify the Department of Transportation by telephone and submit a written report of incidents involving death, injury, or large property loss to the agency. A written report must be made on any unintentional release (a spill, accident, or leakage) of product.

DOT hazardous materials regulations apply primarily to international and interstate transportation (transportation across state borders). They do not apply to intrastate carriers (transportation within one state) unless the carrier also engages in interstate transportation. However, most states have adopted these federal regulations (49 CFR) in whole or in part for intrastate carriers. To find out what regulations apply to transportation of hazardous materials within your state, check with the state and local agencies that have authority.

DOT Placard Requirements

Effective November 1, 1981, new DOT regulations require that each tank truck vehicle must display a designated four-digit number. The identification numbering system is based primarily on the system adopted for worldwide use by the United Nations Committee of Experts on the Transport of Dangerous Goods.

The numbers are assigned by governmental authorities under the aegis of the Economic and Social Council of the United Nations, and each number has the same meaning throughout worldwide commerce. Each four-digit number identifies a specific hazardous material, and each has no other meaning or use. For example, 1294 will always signify Toluene (Toluol).

As an adjunct to the identification system, a manual has been prepared to associate the identification number with a brief instruction that is intended to assist emergency personnel during the first minutes of a hazardous materials accident. This manual is called the *Emergency Action Guide* and is supplied to all emergency response vehicles.

Tank trucks carrying hazardous materials must have the Hazardous Identification (HI) number on all four sides. It can be applied in two ways: an identification number label in addition to the existing placard, with the orange colored label having a black border and black 4-in. high numbers; or the number can be displayed in the existing placard already required by DOT.

However, a tank vehicle transporting gasoline or fuel oil has a third option because special placarding rules have been established for these products. In order to eliminate the need for changing the numbered placards each time the product carried changes, a single placard may be used with the HI number associated with the lowest flash point of any distillate fuel ever carried in the tank.

In addition, placards with the words "gasoline" or "fuel oil" on the diamond-shaped placard in place of the HI number are also authorized. If a tank contains only gasoline or fuel oil and has the words "gasoline" or "fuel oil" on each side and rear in 2-in. letters, or uses placards having the words "gasoline" or "fuel oil" in place of the HI number, the HI number will not be required.

DOT Label Requirements

DOT hazardous materials regulations require diamond-shaped labels on shipping containers holding an amount of hazardous material which could cause a hazardous condition in transportation. These color-coded labels bear a hazard symbol, or pictograph, and the name of the hazard. They carry no warning text. Regulations generally permit only a single label on a multi-hazard exposure, that label showing the most dangerous hazard present. Where a material is extremely toxic, explosive, or highly radioactive, the proper label must be used in addition to any other hazard label. In addition the package must be marked with the name of contents as it appears on a Commodity List in DOT regulations. This may be a chemical name or a class name such as "Corrosive Liquid N.O.S.," so is of secondary usefulness. On compressed gas cylinders, the label may be attached to a wire-tied tag.

Presence of a DOT label on a package or container indicates a dangerous hazard. Because of exemptions, based mostly on the size of inner containers placed in an outside shipping container, a package without a DOT label may contain significant amounts of fairly dangerous materials, including flammable liquids.

A chart showing the DOT placards and labels is available from DOT by writing: U.S. Department of Transportation, Research and Special Programs Administration, Materials Transportation Bureau, Office of Operations and Enforcement, Washington, DC 20590.

United Nations System (IMCO Code)

International shipments of hazardous materials are subject to requirements of the IMCO code (Intergovernmental Maritime Consultative Organization). The IMCO Code contains both hazard class and division designations for materials. The names IMCO and UN are used interchangeably when referring to these classes and divisions.

The difference between the IMCO (UN) system and the DOT hazard class system are the designations given to the different hazard classes. Instead of a name such as flammable liquid for a class of materials, IMCO (UN) assigns a class and a division number. UN class and division numbers may be displayed at the bottom of placards.

The following is a listing of IMCO (UN) classes and divisions, including basic definitions. Corresponding DOT classes are included within the parentheses.

Class 1 - Explosives

Division 1.1—Substances and articles that have a mass explosion hazard. (Explosive A)

Division 1.2—Substances and articles that have a projection hazard but not a mass explosion hazard. (Explosive A or B)

Division 1.3—Substances and articles that have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not mass explosion hazard. (Explosive B)

Division 1.4—Substances and articles that present no significant hazard. (Explosive C)

Division 1.5—Very insensitive substances. (Blasting Agent)

Class 2 - Gases (compressed, liquefied or dissolved under pressure)

Division 2.1—Flammable gases. (Flammable gas)

Division 2.2—Nonflammable gases. (Nonflammable gas)

Division 2.3—Poison gases. (Poison A)

Class 3 - Flammable liquids

Division 3.1—Low flash point group (liquids with flash points below 0°F). (Flammable liquid)

Division 3.2—Intermediate flash point group (liquids with flash points of 0°F or above but less than 73°F). (Flammable liquid)

Division 3.3—High flash point group (liquids with flash points of 73°F or above up to and including 141°F). (Flammable liquid or Combustible liquid)

Class 4 - Flammable solids or substances

Division 4.1—Flammable solids. (Flammable solid)

Division 4.2—Substances liable to spontaneous combustion. (Flammable solid or, for pyroforic liquids, Flammable liquid)

Division 4.3—Substances emitting flammable gases when wet. (Flammable solid)

Class 5 - Oxidizing substances

Division 5.1—Oxidizing substances or agents. (Oxidizer)

Division 5.2—Organic peroxides. (Organic peroxide)

Class 6 - Poisonous and infectious substances

Division 6.1—Poisonous substances. (Poison B)

Division 6.2—Infectious substances. (Etiologic agent)

Class 7 - Radioactive substances. (Radioactive material)

Class 8 - Corrosives. (Corrosive material)

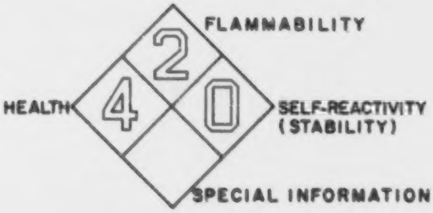
Class 9 - Miscellaneous dangerous substances. (Other regulated material)

The NFPA 704 System of Hazard Identification

NFPA 704, Identification of the Hazards of Materials, is a symbol system intended for use on fixed installations, such as chemical processing equipment, storage and warehousing rooms, and laboratory entrances. It tells a fire fighter what he must do to protect himself from injury while fighting a fire in the area.

The NFPA 704 Diamond

The information system is based on the "704 diamond" (see illustration) which is the vehicle for visually presenting information on health, flammability, and self-reactivity hazards, as well as special information associated with the hazards.



Numbers from 0 through 4 are placed in the three upper squares of the diamond to show the degree of hazard present for each of the three hazards. The 0 indicates the lowest degree of hazard; the 4, the highest. The fourth square, at the bottom, is used for special information. Three symbols for this latter space are suggested. They are:

1. A letter W with a bar through it (W) to indicate that a material may have a hazardous reaction with water. This does *not* mean "do not use water," since some forms of water — fog or fine spray — may be used in many cases. What it does say is: "Water may cause a hazard, so use it very cautiously until you have proper information."
2. The letters "ox" to identify materials that possess oxidizing properties.
3. The "radioactive pinwheel" for radioactive materials.

The NFPA 704 diamond symbol is intended to provide immediacy at some sacrifice of adequacy, and there is a tendency to read more into it than it says. The five degrees of hazard, in the order of their descendency, have these general meanings to fire fighters:

4—Too dangerous to approach with standard fire fighting equipment and procedures. Withdraw and obtain expert advice on how to handle.

3—Fire can be fought using methods intended for extremely hazardous situations, such as unmanned monitors or personal protective equipment which prevents all bodily contact.

2—Can be fought with standard procedures, but hazards are present which require certain equipment or procedures to handle safely.

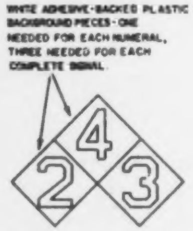
1—Nuisance hazards present which require some care, but standard fire fighting procedures can be used.

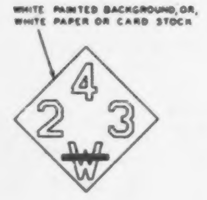
0—No special hazards, therefore no special measures.

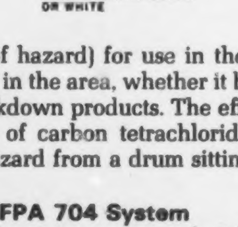
NFPA 704 describes in detail the hazards and hazard levels which the various numbers indicate for the three hazards.

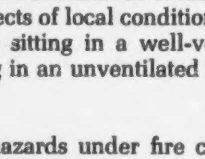
Methods of Presentation

Considerable leeway is allowed in the presentation of the numbers. The only basic requirement is that numbers be spaced as though they were in the diamond outline. Several methods which have been used are shown here. Chapter 5 of the Standard gives recommended layout and sizes for the symbol, and a distance-legibility table, as well as several examples of using the symbol.


WHITE ADHESIVE-BACKED PLASTIC BACKGROUND PIECES - ONE NEEDED FOR EACH NUMERAL, THREE NEEDED FOR EACH COMPLETE SIGNAL.
4
2
3


WHITE PAINTED BACKGROUND, OR, WHITE PAPER OR CARD STOCK
4
2
3
W


SOLID BACKGROUNDS
RED
4
BLUE
2
3
YELLOW
WHITE
NUMBERS IN CONTRASTING COLORS SUCH AS BLACK OR WHITE


FLAMMABILITY SIGNAL- RED
HEALTH SIGNAL- BLUE
REACTIVITY SIGNAL- YELLOW
4
2
3

Numbers (degrees of hazard) for use in the diamond are assigned on the basis of the worst hazard expected in the area, whether it be from hazards of the original material or of its combustion or breakdown products. The effects of local conditions must be considered. For instance, a drum of carbon tetrachloride sitting in a well-ventilated storage shed presents a different hazard from a drum sitting in an unventilated basement.

Advantages of the NFPA 704 System

The NFPA 704 System can warn against hazards under fire conditions of materials which other information systems class as nonhazardous. For example, edible tallow produces toxic and irritating combustion products. It would be given a "2" degree of health hazard, indicating the need for air-supplied respiratory equipment.

NFPA 704 also can warn against overall fire hazards in an area. On the door of a laboratory or storage room, it can warn of the worst hazards likely in a fire situation. Such information is useful both in preplanning and in actual fires.

NFPA 704 can be used without a supplementary manual. Because of its simplicity, the general meanings of the numbers can be memorized easily and the whole symbol read and interpreted quickly on the spot and in poor light.

Disadvantages of the NFPA 704 System

The NFPA 704 system makes no provision for oxygen donor-type oxidizers. It gives only minimum information on the hazards themselves. Since the system informs on protective measures, the same number may be used for different types of hazards so that, for instance, a Health Hazard "3" means "No contact" without saying whether the hazard is corrosive to the skin or toxicity by absorption through the skin. Thus, the symbol is most useful only to trained or informed persons.

Directory of Help For Planning for Hazardous Materials Emergencies

TRAINING PROGRAMS

Agency	Contact	Square Miles	Population
ALABAMA			
Birmingham Fire and Rescue Service 1808 Seventh Avenue, North Birmingham, AL 35235 (205) 323-8304	O.N. Gallant Fire Chief	100	275,000
ARIZONA			
Phoenix Fire Department Room 465 620 West Washington Street Phoenix, AZ 85503 (602) 262-6297	Gary P. Morris Captain	350	800,000
Tucson Fire Department P.O. Box 27210 Tucson, AZ 85720 (602) 791-4502	David H. Canterbury Captain	112	400,000
ARKANSAS			
Pine Bluff Fire Department Civic Center 200 East Eighth Street Pine Bluff, AR 71601 (501) 534-0011	Ray Jacks Fire Chief	17	57,380
CALIFORNIA			
Los Angeles Fire Department 200 North Main Street Los Angeles, CA 90012 (213) 485-6100	James Young Battalion Chief	467.63	3,000,000

Agency	Contact	Square Miles	Population
Merced Fire Department P.O. Box 2068 Merced, CA 95344 (209) 722-8331	Kenneth W. Mitten Fire Chief	16	39,800
Sacramento Fire Department Room 3 915 I Street Sacramento, CA 95814 (916) 449-5266	Jan Dunbar Captain	94	295,000
San Clemente Fire Department 100 Avenida Presidio San Clemente, CA 92672 (714) 492-5105	Ronny Coleman Fire Chief	15	27,000
San Francisco Fire Department 260 Golden Gate Avenue San Francisco, CA 94102 (415) 861-8000	Jerry Grey Captain	49	690,000 night 1,250,000 day
COLORADO			
Aurora Fire Department 1470 South Havana Street Aurora, CO 80012 (303) 695-7116	Fay B. Sweat Training Chief	65	175,000
Barcroft Fire Protection District 3301 South Field Street Lakewood, CO 80227 (303) 989-4307	Bob Porter Assistant Chief	80	155,000
Boulder Fire Department P.O. Box 791 Boulder, CO 80306 (303) 441-3351	Larry Stern Assistant Chief	20	80,000
Castlewood Fire Protection District 7281 East Day Creek Road Englewood, CO 80012 (303) 770-3720	Bob May Training Officer	40	40,000 night 100,000 day
Denver Fire Department 745 West Colfax Avenue Denver, CO 80204 (303) 575-5522	John Marshall Lieutenant, Bureau of Fire Prevention	117	485,000
Lakewood Fire Department 1545 Robb Street Lakewood, CO 80215 (303) 237-9588	Tom Dellinger Assistant Chief	30	110,000
Littleton Fire Department 2255 West Berry Avenue Littleton, CO 80165 (303) 795-3800	Phillip Kessler Training Officer	45	107,000

Agency	Contact	Square Miles	Population
CONNECTICUT			
Hartford Fire Department 275 Pearl Street Hartford, CT 06103 (203) 525-3123	Raymond McTeague Deputy Fire Chief	18.9	150,000
Thompsonville Fire Department Pearl Street Station Enfield, CT 06802 (203) 745-3365	Paul E. Censki Fire Marshall	12	12,000
West Haven Fire Department 336 Elm Street West Haven, CT 06516 (203) 932-2228	William S. Johnson Fire Chief	10.4	53,000
DELAWARE			
Wilmington Fire Department 112 East Twelfth Street Wilmington, DE 19801 (302) 571-4410	Jerome Donohue Fire Chief	15.77	95,000
FLORIDA			
Jacksonville Fire Division 107 Market Street Jacksonville, FL 32202 (904) 633-5433	Ron G. Gore Captain	844	600,000
ILLINOIS			
Des Plaines Fire Department 405 South River Road Des Plaines, IL 60016 (312) 391-5333	David Clark Deputy Chief, Training	17	57,000
INDIANA			
Indianapolis Fire Department Training Academy 901 N. Post Road Indianapolis, IN 46219	Captain Ronald Callahan Director of Training	85	750,000
KANSAS			
Wichita Fire Department City Hall, Twelfth Floor 455 North Main Street Wichita, KS 67207 (316) 268-4451	Jim Sparr Fire Chief	110	285,000
LOUISIANA			
New Orleans Fire Department 317 Decatur Street New Orleans, LA 70130 (503) 581-6200	John L. Riviere Training Chief	199	565,000
MARYLAND			
Montgomery County Fire and Rescue Services 101 Monroe Street Rockville, MD 20852 (301) 251-2443	Warren E. Isman Fire Chief	506	600,000

Agency	Contact	Square Miles	Population
MASSACHUSETTS			
Boston Fire Department 115 South Hampton Street Boston, MA 02118 (617) 442-8000	Walter Cameron Deputy Chief	47	600,000
Plymouth Fire Department 114 Sandwich Street Plymouth, MA 02360 (617) 746-2212	Arthur H. Lamb Fire Chief	109	38,000
Springfield Fire Department 605 Worthington Street Springfield, MA 01105 (413) 787-6400	Norris Quinn District Chief, Training	32	160,000
MINNESOTA			
Minneapolis Fire Department City Hall, Room 230 Minneapolis, MN 55415 (612) 348-2890	Emmett M. Kaufmann Assistant Chief of Training	58	370,091
MISSISSIPPI			
Pass Christian Fire Department 110 West Second Street Pass Christian, MS 39574 (601) 452-9715	George M. Mixon Fire Chief	6	5,000
MISSOURI			
Fort Osage Fire Protection District 319 South Central Buckner, MO 64016 (816) 249-3636	Richard Lehmann Fire Chief	110	9,800
Springfield Fire Department 235 North Kimbrough Avenue Springfield, MO 65804 (417) 864-1046	Gene Nichols Chief, Fire Operations and Training	78	170,000
NEBRASKA			
Grand Island Fire Department 302 South Pine Street Grand Island, NE 68801 (308) 381-5300	George Arnett Fire Chief	18.5	34,000
NEVADA			
Las Vegas Fire Department 400 East Stewart Avenue Las Vegas, NV 89101 (702) 386-6376	Rex Shelburne Captain, Paramedic Coordinator	59	168,000
NORTH CAROLINA			
Durham Fire Department 2008 East Club Boulevard Durham, NC 27707 (919) 683-4242	George King Captain, Training Division	40	105,000

Agency	Contact	Square Miles	Population
OHIO			
Cincinnati Fire Department 430 Central Avenue Cincinnati, OH 45202 (513) 352-2315	Robert G. Rathman Assistant Chief	78	385,000
OREGON			
Multnomah County Fire District 10 (Interagency) P.O. Box 16368 Portland, OR 97216 (503) 760-1081	Len Malmquist Assistant Fire Marshal	75.2	380,000
Ontario Fire Department and Rural Fire District 7-302 444 S.W. Fourth Street Ontario, OR 97914 (503) 889-7687	Larry Roberts Fire Chief	59	18,000
Portland Fire Bureau 55 S.W. Ash Street Portland, OR 97204 (503) 248-4375	Bill Hebert Chief Training Officer	108	380,000
PENNSYLVANIA			
Philadelphia Fire Department Third and Spring Garden Streets Philadelphia, PA 19123 (215) 686-4700	Joseph R. Rizzo Fire Commissioner	129	1,688,210
RHODE ISLAND			
Narragansett Fire Department 40 Caswell Street Narragansett, RI 02882 (401) 789-1000	Otis C. Wyatt, Jr. Fire Chief	14	12,000
TEXAS			
Dallas Fire Department 1500 Marilla Street Dallas, TX 75201 (214) 670-4565	S. Joseph O'Briant Deputy Chief	378	904,000
Houston Fire Department 410 Bagby Street Houston, TX 77002 (713) 222-3964	M.H. McRae District Chief	556	1,500,000
VIRGINIA			
Chesterfield County Fire Department P.O. Box 40 Chesterfield, VA 23832 (804) 748-1360	David E. Barfield Battalion Chief Training Officer	446	152,000
Virginia Beach Fire Department Public Safety Building Virginia Beach, VA 23456 (804) 426-6272	Frank Bennett District Chief	310	272,000

Agency	Contact	Square Miles	Population
WASHINGTON Wenatchee Fire Department 136 South Chelan Wenatchee, WA 98801 (509) 662-6125 (pesticides)	Mike Brown Fire Chief	5	20,000

RESPONSE TEAMS

Agency	Contact	Square Miles	Population
ARIZONA Mesa Fire Department 13 West First Street Mesa, AZ 85201 (602) 834-2101	Douglas Ellis Training Captain	68	170,000
Phoenix Fire Department Room 465 620 West Washington Street Phoenix, AZ 85503 (602) 262-6297	Gary P. Morris Captain	350	800,000
Tucson Fire Department P.O. Box 27210 Tucson, AZ 85720 (602) 791-4502 (602) 791-4434 Dispatch 24 Hour	David H. Canterbury Captain	10,000 (multijurisdictional)	500,000
CALIFORNIA Los Angeles Fire Department 200 North Main Street Los Angeles, CA 90012 (213) 485-6100	James Young Battalion Chief	467.3	3,000,000
Los Angeles County Fire Department 1320 North Eastern Avenue Los Angeles, CA 90063 (213) 267-2485	Stephen Sherrill Battalion Chief	2,190	2,500,000
Sacramento Fire Department Room 3 915 I Street Sacramento, CA 95814 (916) 449-5266	Jan Dunbar Captain	94	295,000
San Francisco Fire Department 260 Golden Gate Avenue San Fransisco, CA 94102 (415) 861-8000	Jerry Grey Captain	49	690,000 night 1,250,000 day

Agency	Contact	Square Miles	Population
San Jose Fire Department 476 Park Avenue San Jose, CA 95112 (408) 277-4251	Mike Jonasonn Captain	210	637,000
COLORADO			
Aurora Fire Department 1470 South Havana Street Aurora, CO 80012 (303) 695-7116	Fay B. Sweat Training Chief	65	175,000
Barcroft Fire Protection District 3301 South Field Street Lakewood, CO 80227 (303) 989-4307	Bob Porter Assistant Chief	80	155,000
Colorado Springs Fire Department 31 South Weber Street Colorado Springs, CO 80903 (303) 471-6820	Richard Smith Chief	103	215,000
Denver Fire Department 745 West Colfax Avenue Denver, CO 80204 (303) 575-5522	John Marshall Lieutenant, Bureau of Fire Prevention	117	485,000
FLORIDA			
Jacksonville Fire Division 107 Market Street Jacksonville, FL 32202 (904) 633-5433	Ron G. Gore Captain	844	600,000
Metro-Dade County Fire Department 6000 S.W. 87th Avenue Miami, FL 33173 (305) 596-8600	Charles E. Sowers Division Chief, EMS	895	1,000,000
Miami Fire Department P.O. Box 330708 Miami, FL 33133 (305) 579-6300	E.J. Bratz Captain	34	365,000
ILLINOIS			
Springfield Fire Department 201 North Seventh Street Springfield, IL 62701 (217) 788-8467	Clifford Garst Deputy Chief, Special Services	90	140,000
KANSAS			
Wichita Fire Department City Hall, Twelfth Floor 455 North Main Street Wichita, KS 67207 (316) 268-4451	Jim Sparr Fire Chief	1,008 (multijurisdictional)	360,000

Agency	Contact	Square Miles	Population
KENTUCKY			
Louisville Fire Division 1135 West Jefferson Street Louisville, KY 40203 (502) 587-3701	George J. Herbert Assistant Chief of Suppression	702	270,000
MARYLAND			
Anne Arundel County Fire Department P.O. Box 276 Millersville, MD 21108 (301) 987-4010	Burton Phelps Deputy Chief	324	400,000
Baltimore City Fire Department 410 East Lexington Street Baltimore, MD 21202 (301) 396-5683	Donald Webb Captain, Training Officer	92	860,000
Montgomery County Fire and Rescue Services 101 Monroe Street Rockville, MD 20852 (301) 251-2443	Warren E. Isman Fire Chief	506	600,000
MASSACHUSETTS			
Nantucket Fire Department (petrochemical spill) Lower Pleasant Street Nantucket, MA 02554 (617) 228-2324	Robert B. Farley EMT/FF	50	6,500 winter 40,000 summer
Pembroke Fire Department Fire Headquarters Center Street Pembroke, MA 02359 (617) 293-2300	Robert Silva Fire Investigator	23	13,000
MISSOURI			
Kansas City Fire Department City Hall, 22nd Floor 414 East Twelfth Street Kansas City, MO 64106 (816) 531-2121	John Hamilton Deputy Chief. Administration	316.5	475,000
Lee's Summit Fire Department 207 South Douglas Street Lee's Summit, MO 64063 (816) 251-2345	Mike Wren Acting Fire Chief	74	30,000
NEBRASKA			
David City Volunteer Fire Department P.O. Box 254 David City, NE 68632 (402) 367-3530	Bill Ortmeir Fire Chief	55	5,100

Agency	Contact	Square Miles	Population
Lincoln Fire Department 1801 Q Street Lincoln, NE 68508 (402) 473-6363	Mike Merwick Fire Chief	55	176,000
NEVADA			
Carson City Fire Department (Interagency) 111 North Curry Street Carson City, NV 89701 (702) 887-2200	Bernie Sease Fire Chief	146	33,000
Las Vegas Fire Department 400 East Stewart Avenue Las Vegas, NV 89101 (702) 386-6376	Rex Shelburne Captain, Paramedic Coordinator	59	168,000
NEW YORK			
New York Fire Department 270 Livingston Street Brooklyn, NY 11201 212-403-1555 or 1556	John O'Rourke Hazardous Materials Coordinator	320	7,149,300
OREGON			
Multnomah County Fire District 10 (multijurisdictional) P.O. Box 16368 Portland, OR 97216 (503) 760-1081	Len Malmquist Assistant Fire Marshal	75.2	380,000
PENNSYLVANIA			
North Hempfield Volunteer Fire Company RD 3, Box 400 Greensburg, PA 15601 (412) 834-9832	Jack W. Simon Fire Chief	1,040 (multijurisdictional)	395,000
Philadelphia Fire Department Third & Spring Garden Streets Philadelphia, PA 19123 (215) 686-4700	Joseph R. Rizzo Fire Commissioner	129	1,688,210
TEXAS			
Houston Fire Department 410 Bagby Street Houston, TX 77002 (713) 222-3964	M. H. McRae District Chief	556	1,500,000
WASHINGTON			
Bellingham Fire Department 210 Lottie Street Bellingham, WA 98225 (206) 676-6813	Michael Leigh Assistant Chief	25	46,000
Seattle Fire Department 301 Second Avenue, South Seattle, WA 98104 (206) 625-4091	Rod Bower Deputy Chief	97.5	500,000

Agency	Contact	Square Miles	Population
WISCONSIN Madison Fire Department 325 West Johnson Street Madison, WI 53704 (608) 266-4420	Edward D. Durkin Fire Chief	52	170,000
Milwaukee Fire Department 711 West Wells Street Milwaukee, WI 53209 (414) 276-5656, Ext. 320	Gustave Koleas Deputy Chief	98	635,000
Spokane Fire Department W. 44 Riverside Ave. Spokane, WA 99201 (509) 456-2694	Richard Sweetland Assistant Chief	57	180,000

RESPONSE PLANS

Agency	Contact	Square Miles	Population
ALABAMA Birmingham Fire and Rescue Service 1808 Seventh Avenue, North Birmingham, AL 35235 (205) 323-8304	O. N. Gallant Fire Chief	100	275,000
Center Point Fire Department P.O. Box 9651 Center Point, AL 35215 (205) 853-5098	J. D. Wallace, Jr. Fire Chief	50	68,000
Hoover Fire Department 1581 Patton Chapel Road Hoover, AL 35226 (205) 823-4060	T. E. Bradley Fire Chief	50	23,000
ARIZONA Mesa Fire Department 13 West First Street Mesa, AZ 85201 (602) 834-2101	Douglas Ellis Training Captain	68	170,000
Phoenix Fire Department Room 465 620 West Washington Street Phoenix, AZ 85503 (602) 262-6297	Gary P. Morris Captain	350	800,000
Tucson Fire Department P.O. Box 27210 Tucson, AZ 85720 (602) 791-4502	David H. Canterbury Captain	10,000 (multijurisdictional)	500,000

Agency	Contact	Square Miles	Population
ARKANSAS			
Pine Bluff Fire Department Civic Center 200 East Eighth Street Pine Bluff, AR 71601 (501) 534-0011	Ray Jacks Fire Chief	17	57,380
CALIFORNIA			
Los Angeles Fire Department 200 North Main Street Los Angeles, CA 90012 (213) 485-6100	James Young Battalion Chief	467.63	3,000,000
Sacramento Fire Department Room 3 915 I Street Sacramento, CA 95814 (916) 449-5266	Jan Dunbar Captain	94	295,000
San Clemente Fire Department 100 Avenida Presidio San Clemente, CA 92672 (714) 492-5105	Ronny Coleman Fire Chief	786 (multijurisdictional)	1,900,000
San Francisco Fire Department 260 Golden Gate Avenue San Francisco, CA 94102 (415) 861-8000	Jerry Grey Captain	49	690,000 night 1,250,000 day
Santa Rosa Fire Department 955 Sonoma Avenue Santa Rosa, CA 95404 (707) 528-5311	Gordon Stedman Training Director	27	82,000
COLORADO			
Barcroft Fire Protection District 3301 South Field Street Lakewood, CO 80227 (303) 989-4307	Bob Porter Assistant Chief	80	155,000
Boulder Fire Department P.. Box 791 Boulder, CO 80306 (303) 441-3351	Larry Stern Assistant Chief	20	80,000
Denver Fire Department 745 West Colfax Street Denver, CO 80204 (303) 575-5522	John Marshall Lieutenant, Bureau of Fire Prevention	117	485,000
Littleton Fire Department 2255 West Berry Avenue Littleton, CO 80165 (303) 795-3800	Phillip Kessler Training Officer	45	107,000

Agency	Contact	Square Miles	Population
CONNECTICUT			
Branford Fire Department 45 North Main Street Branford, CT 06405 (203) 488-7266	Peter Mullen Deputy Chief	27.9	29,000
Hartford Fire Department 275 Pearl Street Hartford, CT 06103 (203) 525-3123	Charles A. Gallon Assistant Fire Chief	18.9	150,000
Tolland Fire Department 3 Rhodes Street Tolland, CT 06084 (203) 871-0002	Ronald Littell Fire Chief	41	11,000
FLORIDA			
Hialeah Fire Department 501 Palm Avenue Hialeah, FL 33011 (305) 883-5840	William Ackerly District Chief, Rescue Coordinator	22	180,000
Jacksonville Fire Department (Interagency) 107 Market Street Jacksonville, FL 32202 (904) 633-5433	Ron G. Gore Captain	844	600,000
Metro-Dade County Fire Department 6000 S.W. 87th Avenue Miami, FL 33173 (305) 596-8600	Charles E. Sowers Division Chief, EMS	895	1,000,000
ILLINOIS			
Des Plaines Fire Department 405 South River Road Des Plaines, IL 60016 (312) 391-5333	David Clark Deputy Chief, Training	17	57,000
KANSAS			
Wichita Fire Department City Hall, Twelfth Floor 455 North Main Street Wichita, KS 67207 (316) 268-4451	Jim Sparr Fire Chief	1,008 (multijurisdictional)	360,000
MARYLAND			
Montgomery County Fire and Rescue Services 101 Monroe Street Rockville, MD 20852 (301) 251-2443	Warren E. Isman Fire Chief	506	600,000
MASSACHUSETTS			
Pembroke Fire Department Fire Headquarters Center Street Pembroke, MA 02359 (617) 293-2300	Robert Silva Fire Investigator	23	13,000

Agency	Contact	Square Miles	Population
Seekonk Fire Department Town Hall 100 Peck Street Seekonk, MA 02771 (617) 336-8510	John E. Shaw Fire Chief	13	12,000
Springfield Fire Department 605 Worthington Street Springfield, MA 01105 (413) 787-6400	Norris Quinn District Chief, Training	32	160,000
MISSISSIPPI			
Pass Christian Fire Department 110 West Second Street Pass Christian, MS 39574 (601) 452-9715	George M. Mixon Fire Chief	6 900 (multijurisdictional)	5,000 200,000
MISSOURI			
Lee's Summit Fire Department 207 South Douglas Street Lee's Summit, MO 64063 (816) 251-2345	Mike Wren Acting Fire Chief	74	30,000
Springfield Fire Department 235 North Kimbrough Avenue Springfield, MO 65804 (417) 864-1046	Gene Nichols Chief, Fire Operations and Training	78	170,000
NEBRASKA			
Grand Island Fire Department 302 South Pine Street Grand Island, NE 68801 (308) 381-5300	George Arnett Fire Chief	18.5	34,000
NEVADA			
Las Vegas Fire Department 400 East Stewart Avenue Las Vegas, NV 89101 (702) 386-6736	Rex Shelburne Captain, Paramedic Coordinator	59	168,000
NEW JERSEY			
Hoboken Fire Department 201 Jefferson Street Hoboken, NJ 07030 (201) 420-2259	Ed McDonald Deputy Chief	1	45,000
OKLAHOMA			
Tulsa Fire Department 411 South Frankfurt Avenue Tulsa, OK 74120 (918) 581-5291	Paul M. Dudley Deputy Chief	196	365,000
OREGON			
Multonomah County Fire District 10 P.O. Box 16368 Portland, OR 97216 (503) 760-1081	Len Malmquist Assistant Fire Marshall	75.2 (multijurisdictional)	380,000

Agency	Contact	Square Miles	Population
Tualatin Rural Fire Protection District P.O. Box 127 Tualatin, OR 97062 (503) 682-2601	Douglas Krebs Executiva Assistant Chief	104	100,000
PENNSYLVANIA			
Philadelphia Fire Department Third and Spring Garden Streets Philadelphia, PA 19123 (215) 686-4700	Joseph R. Rizzo Fire Commissioner	129	1,688,210
RHODE ISLAND			
North Kingstown Fire Department 8150 Post Road North Kingstown, RI 02852 (401) 294-3344	Thomas L. Aylward Fire Chief	44	29,000
TEXAS			
Dallas Fire Department 1500 Marilla Street Dallas, TX 75201 (214) 670-4565	S. Joseph O'Briant Deputy Chief	378	904,000
VIRGINIA			
Fairfax City Fire and Rescue Services 4081 University Drive Fairfax, VA 22030 (703) 385-7874	Joe Bailey Lieutenant, Training Officer	7	22,000
WASHINGTON			
Bellevue Fire Department 666 Bellevue Way, S.W. Bellevue, WA 98004 (206) 455-6892	Bob Hayes Assistant Director, EMS	34	105,000
Bellingham Fire Department 210 Lottie Street Bellingham, WA 98225 (206) 676-6813	Michael Leigh Assistant Chief	25	46,000
Ellensburg Fire Department 102 North Perl Street Ellensburg, WA 98926 (509) 962-9863, Ext. 274	Ed West Fire Chief	5	14,000
Seattle Fire Department 301 Second Avenue, South Seattle, WA 98104 (206) 625-4091	Rod Bower Deputy Chief	97.5	500,000
Spokane Fire Department West 44 Riverside Avenue Spokane, WA 99201 (509) 456-2694	Richard Sweetland Assistant Chief	57	180,000

TRAINING MANUALS

Agency	Contact	Square Miles	Population
ARIZONA			
Mesa Fire Department 13 West First Street Mesa, AZ 85201 (602) 834-2101	Douglas Ellis Training Captain	68	170,000
Phoenix Fire Department Room 465 620 West Washington Street Phoenix, AZ 85503 (602) 262-6297	Gary P. Morris Captain	350	800,000
Tucson Fire Department P.O. Box 27210 Tucson, AZ 85720 (602) 791-4511	David H. Canterbury Captain	112	400,000
Yuma Fire Department 298 West Fourth Street Yuma, AZ 85364 (602) 782-1831	Jerry L. Chapman Battalion Chief, Training Officer	15	50,000
CALIFORNIA			
Sacramento Fire Department Room 3 915 I Street Sacramento, CA 95814 (916) 449-5266	Jan Dunbar Captain	94	295,000
CONNECTICUT			
Hartford Fire Department 275 Pearl Street Hartford, CT 06103 (203) 525-3123	Raymond McTeague Deputy Fire Chief	18.9	150,000
MASSACHUSETTS			
Pembroke Fire Department Fire Headquarters Center Street Pembroke, MA 02359 (617) 293-2300	Robert Silva Fire Investigator	23	13,000
Springfield Fire Department 605 Worthington Street Springfield, MA 01105 (413) 787-6400	Norris Quinn District Chief, Training	32	160,000
NEVADA			
Las Vegas Fire Department 400 East Stewart Avenue Las Vegas, NV 89101 (702) 386-6376	Rex Shelburne Captain, Paramedic Coordinator	59	168,000
TEXAS			
Dallas Fire Department 1500 Marilla Street Dallas, TX 75201 (214) 670-4565	S. Joseph O'Briant Deputy Chief	378	904,000
WASHINGTON			
Spokane Fire Department West 44 Riverside Avenue Spokane, WA 99201 (509) 456-2694	Richard Sweetland Deputy Chief	57	180,000

EXPERIENCED PERSONS AND ORGANIZATIONS

Contact	Agency	Areas of Expertise
ALABAMA		
Chipley, Alfred S. Director	Division of Solid and Hazardous Waste Alabama Department of Public Health 434 Monroe Street Montgomery, AL 36130 (205) 832-6728	Technical Assistance
Cope, Melvin	P.O. Box 532 Bessemer, AL 35021 (205) 923-7171 (O) (205) 426-1864 (H)	Household Pest Control Pesticide Spray
Hester, Frank Chemical Engineer	Industrial Maintenance Cleaning Contractors, Inc. P.O. Box 569 Bessemer, AL 35021 (205) 428-0621 (O) (205) 428-4084 (H)	Cleaning Chemicals
Oliver, Avery Chairperson	Greater Mobile Industrial Association c/o Shell Chemical Company P.O. Box 525 Axis, AL 36505 (205) 675-2450, Ext. 204	Community Mutual Aid Technical Assistance
Williford, E. John Chief, Monitoring and Surveillance	Alabama Water Improvement Commission Public Health Services Building Montgomery, AL 36130 (205) 277-3630	Response Technical Assistance
ARIZONA		
Burch, Jim Captain	Phoenix Fire Department Room 465 620 West Washington Street Phoenix, AZ 85504 (602) 262-6595	Training Response
Canterbury, David H. Captain, Explosives/ Hazardous Materials Section	Tucson Fire Department P.O. Box 27210 Tucson, AZ 85720 (602) 791-4502 (602) 791-4434 Dispatch 24 hours	Training Emergency Response Technical Assistance Multi-jurisdictional response plans
Eberhart, Tony Battalion Chief	Phoenix Fire Department Room 465 620 West Washington Street Phoenix, AZ 85504 (602) 262-6595	Training Response

Contact	Agency	Areas of Expertise
Hermann, Stephen Hazardous Materials Specialist	Arizona Department of Public Safety 2222 W. Encanto Boulevard P.O. Box 6638 Phoenix, AZ 85005 (602) 262-8082	Technical Assistance
Overley, Gail President	Overleys, Inc. 650 West Southern Avenue Mesa, AZ 85202 (602) 962-6638	Transportation and Waste Cleanup
Vaughn, Johnny M. Hazardous Materials Supervisor	Arizona Department of Public Safety 2222 W. Encanto Boulevard P.O. Box 6638 Phoenix, AZ 85005 (602) 262-8082	Technical Assistance
ARKANSAS		
Combs, George Engineering Manager	Energy Systems Company P.O. Box 1975 El Dorado, AR 71730 (501) 863-7173	Technical Assistance
Wilson, E. Frank Director	Division of Environmental Health Protection Bureau of Environmental Health Services Arkansas Department of Health 4815 West Markham Street Little Rock, AR 72201 (501) 661-2301	Response
CALIFORNIA		
Coleman, Ronny Fire Chief	San Clemente Fire Department 100 Avenida Presidio San Clemente, CA 92672 (714) 492-5105	Planning Training Response
Dunbar, Jan Captain	Sacramento Fire Department Room 3 915 I Street Sacramento, CA 95814 (916) 449-5266	Training Response Planning
Finocchiaro, Joseph A. Forensic Chemist	Los Angeles Fire Department 200 North Main Street Los Angeles, CA 90012 (213) 485-6100	Training Response
Grey, Jerry Captain	San Francisco Fire Department 260 Golden Gate Avenue San Francisco, CA 94102 (415) 861-8000, Ext. 341	Training Response

Contact	Agency	Areas of Expertise
Meidl, James	Apartment 301 380 Esplanade Pacifica, CA 94044 (415) 359-1592	Technical Assistance
O'Donnell, Jim	South County Industrial Emergency Council c/o South County Fire District 666 Elm Street San Carlos, CA 94070 (415) 578-8011, Ext. 41	Training Regional Coordination
Tompkins, G.A., Ph.D. Hazardous Chemical and Environmental Consultant	EMCON Associates 90 Archer Street San Jose, CA 95112 (408) 275-1444	Technical Assistance
Starr, Dick Coordinator	California Fire Academy 836 Asilomar Boulevard Pacific Grove, CA 93950 (408) 646-4240	Training Programs
Wharton, Richard	Office of State Fire Marshal 7171 Bowling Drive, Suite 600 Sacramento, CA 95823	Training Programs Technical Assistance
Wyngard, Robert L. Chief of Academic Division	California Specialized Training Institute P.O. Box G Camp San Luis Obispo, CA 93406 (805) 544-7100	Training Programs
COLORADO		
DeFreeze, Walt Director	Colorado Training Institute 1001 East 62nd Avenue Denver, CO 80216 (303) 289-4891	Training Programs
Dunn, William S. Chief Chemist	Chemistry Section Colorado Department of Health 4210 East Eleventh Avenue Denver, CO 80220 (303) 320-8333, Ext. 3051	Industrial and Hazardous Waste Technical Assistance and Chemical Analysis
Hazle, Albert J. Director	Radiation Control Division Colorado Department of Health 4210 East Eleventh Avenue Denver, CO 80220 (303) 320-8333, Ext. 6246	Technical Assistance
Heister, Charles Technician, Hazardous Materials Consultant	Training Division Colorado State Patrol 1500 Golden Road Golden, CO 80401 (303) 279-2511	Training Response

Contact	Agency	Areas of Expertise
Marshall, John Lieutenant	Bureau of Fire Prevention Denver Fire Department 745 West Colfax Avenue Denver, CO 80204 (303) 575-5522	Training Response
Martin, William S. Radiological Defense Officer	Division of Disaster Emergency Services Camp George West Golden, CO 80401 (303) 273-1786	Technical Assistance Response Planning
Sutton, Christopher Industrial Hygienist	Colorado Department of Health 4210 East Eleventh Avenue Denver, CO 80220 (303) 320-8333, Ext. 4303	Technical Assistance Sampling
DISTRICT OF COLUMBIA		
Hildebrand, Michael S. Coordinator, Safety and Fire Protection Noll, Gregory G. Fire and Safety Associate	American Petroleum Institute 2101 L Street, N.W. Washington, DC 20037 (202) 457-7000	Technical Assistance Risk Analysis Training
Norton, Lawrence Manager of Regulatory Affairs	National Agriculture Chemical Association 1155 15th Street, N.W. Washington, DC 20005 (202) 296-1585	Technical Assistance Information Referral Pesticide Safety Team Network
Phemister, T.A., Jr. Director	Bureau of Explosives Association of American Railroads 1920 L Street, N.W. Washington, DC 20036 (202) 293-4048	Training Technical Assistance Response
Walsh, Patrick Lieutenant	District of Columbia Fire Department 614 H Street, N.W. Washington, DC 20001 (202) HO2-1762	Training On-Scene Coordination
Zercher, John Director, Chemical Transportation Emergency Center	Chemical Manufacturers Association, Inc. 2501 M Street, N.W. Washington, DC 20037 (202) 887-1255	Information Referral CHEMTREC Response
FLORIDA		
Heiken, Jerold C. P.E., President	Hazards, Inc. Suite 231 8282 Western Way Circle Jacksonville, FL 32216 (904) 731-3432	Training and Education Fire and Industrial Risk Analysis Planning Safety Procedures

Contact	Agency	Areas of Expertise
Gore, R.G. President	Safety Systems, Inc. P.O. Box 8463 Jacksonville, FL 32239 (904) 725-3044	Training Programs, Public Safety and Industrial
GEORGIA		
O'Driscoll, J.J. Director, Safety and Hazardous Materials	Southern Railway System 185 Spring Street, S.W. Atlanta, GA 30303 (404) 529-1917	Training Programs
ILLINOIS		
Bossard, Carl D. Superintendent, Hazardous Materials	Illinois Central and Gulf Railroad Company 233 North Michigan Avenue Chicago, IL 60601 (312) 565-1600, Ext. 2488	Training Programs
Eversole, John Lieutenant	Chicago Fire Department Training Academy 558 West DeKoven Street Chicago, IL 60607 (312) 744-4732	Training Response
Stansky, C.A., Jr. Chief Chemist, Chemicals and Marketing	Process Division UOP, Inc. 20 UOP Plaza Des Plaines, IL 60016 (312) 391-2653 (O) (312) 437-0830 (H)	
IOWA		
Drummond, D.W., Ph.D. Director, Environmental Health and Safety	The University of Iowa 423 North Hall Iowa City, IA 52242 (319) 353-5125	Industrial Hygiene Safety Hazardous Waste Management Biohazard Control
Logue, Russell	Thermal Gas of Ottumwa Brick Plant Road Box 732 Ottumwa, IA 52501 (515) 294-6817	Propane
Murray, Jay Instructor	Fire Service Extension Iowa State University Fire Service Building Ames, IA 50011 (515) 294-6817	Training and Education
Sobottka, Emery Director of Environmental Health and Safety	Iowa State University 215 Nuclear Engineering Laboratory Ames, IA 50011 (515) 294-5359	Education Technical Assistance Radiation Response
Stecker, Robert H. Administrator, Prevention and Mitigation	Office of Disaster Services Hoover State Office Building Level A29 Des Moines, IA 50319 (515) 281-3231	Risk Analysis Planning

Contact	Agency	Areas of Expertise
KANSAS		
Ciccone, Stuart Captain	Training Division Wichita Fire Department City Hall, Twelfth Floor 455 North Main Street Wichita, KS 67202 (316) 268-4579	Training Response
MARYLAND		
Broumel, Thomas P. Assistant Chief Fire Investigator	Office of the State Fire Marshall 34 North Philadelphia Boulevard Aberdeen, MD 21001 (301) 272-4650	Technical Assistance Response
Burgess, William S. Chief, Spill Response Team	Maryland Water Resources Administration Tawes State Office Building Taylor Avenue Annapolis, MD 21401 (301) 269-2104 office (301) 269-3181 other hours	Oil Spills Training Response Technical Assistance
Hess, John C.	Maryland Fire and Rescue Institute University of Maryland College Park, MD 20742 (301) 454-2416	Training Planning
Isman, Warren E. Fire Chief	Montgomery County Fire and Rescue Services 101 Monroe Street Rockville, MD 20852 (301) 251-2443	Training Technical Assistance
Noll, Gregory G. Fire Fighter	c/o Berwyn Heights VFD 6796 Ruhland Drive Frederick, MD 21701 (301) 898-3539 Home (202) 857-5667 Office	Training Response
Pyle, Nelson A. Captain	Anne Arundel County Fire Department P.O. Box 276 Millersville, MD 21108 (301) 768-8723	Training Response
Walsh, Patrick	Hazardous Materials Safety 915 Cindy Lane Westminster, MD 21157 (301) 876-6948	Training On-Scene Coordination
Walters, William F. Firefighter	Washington Gas Light Co. 6801 Industrial Road Springfield, VA 22151 (703) 750-4232 (O) (703) 762-2080 (H)	Propane and Natural Gas Technical Assistance Training Hazardous Materials Response Hazardous Materials Planning

Contact	Agency	Areas of Expertise
MASSACHUSETTS		
Clougherty, E.V., Ph.D. Chemist	Boston Fire Department 115 South Hampton Street Boston, MA 02118 (617) 442-8000	Procedures Technical Assistance
Currier, John Manager, Safety	Boston and Maine Corporation North Billerica, MA 01862 (617) 667-8100	Response
Robinson, John Supervisor, Safety	Boston and Maine Corporation River Road East Deerfield, MA 01342 (413) 772-6448	Response
MICHIGAN		
Hutchenreuther, C.O.	1000 Knollwood Court Midland, MI 48640 (517) 835-5233	Technical Assistance Training Workshops
MINNESOTA		
Kuhlman, R.G. Manager, Fire and Hazardous Materials	Burlington, Northern Railroad 176 East Fifth Street St. Paul, MN 55101 (612) 298-7416	Response
Rukavina, John D., J.D. Administrative Assistant to the Chief	St. Paul Department of Fire and Safety Services 101 East Tenth Street St. Paul, MN 55101 (612) 224-7811	Training Response
Wasnick, Lloyd L. Assistant Vice President, Operations and Administration	Soo Line Railroad P.O. Box 530 Minneapolis, MN 55440 (612) 332-1261, Ext. 404	Planning Training
MISSISSIPPI		
Guice, Wade Director	Harrison County Civil Defense P.O. Box 68 Gulfport, MS 39501 (601) 864-3843	Multijurisdictional Response Plans
MISSOURI		
Bash, John E. Safety Manager	Agriculture Chemical Division Mobay Chemical Corporation P.O. Box 4913 Kansas City, MO 64120 (816) 242-2000 (816) 242-2582	Technical Assistance Response
Lehmann, Richard Instructor-Coordinator	Penn Valley Community College 3201 Southwest Trafficway Kansas City, MO 64111 (816) 932-7649	Training and Education

Contact	Agency	Areas of Expertise
Nichols, Gene Chief, Fire Operations and Training	Springfield Fire Department 235 North Kimbrough Avenue Springfield, MO 65804 (417) 864-1046	Training Response
NEBRASKA		
Wright, Charles Supervisor, Hazardous Materials Training	Union Pacific Railroad 1416 Dodge Street Omaha, NE 68179 (402) 271-3313	Training
Tierney, Leo C. Manager, Environmental Control	Union Pacific Railroad 1416 Dodge Street Omaha, NE 68179 (402) 271-3313	Response
NEW YORK		
Granito, John A. Vice President for Public Service	State University of New York, Binghamton Binghamton, NY 13901 (607) 798-6756	Training and Education Technical Assistance
Lyden, Michael E. Coordinator, Chlorine Emergency Plan	Chlorine Institute 342 Madison Avenue New York, NY 10173 (212) 682-4324	Audiovisual Training Kits Training Programs Response
OKLAHOMA		
Carlson, Gene P.	811 East Tyler Avenue Stillwater, OK 74074 (405) 624-5723	Training
Smith, Jerry R. Assistant Training Officer	Oklahoma City Fire Department 820 N.W. Fifth Street Oklahoma City, OK 73107 (405) 235-3314	Training
OREGON		
Gjersten, E.G., P.E. Registered Professional Engineer	2057 Laurence Street Klamath Falls, OR 97601 (503) 884-7870	Engineering and Hazardous Waste Technical Assistance
PENNSYLVANIA		
Cusick, Harry Battalion Chief, Director of Training	Philadelphia Fire Department Pennypack Street and Delaware River Philadelphia, PA 19124 (215) 335-8060	Training
McNally, J.R. Manager, Hazard Material Control	Consolidated Rail Corporation 1528 Walnut Street Philadelphia, PA 19102 (215) 893-6505	Training Technical Assistance Response

Contact	Agency	Areas of Expertise
Turk, Andrew W. Fire Prevention Administrator	Westinghouse Electric Corporation Advanced Reactor Division P.O. Box 158 Madison, PA 15663 (412) 722-5757 (412) 722-5161 (24-hour)	Training Response Firefighting (Metal) Firefighting (radiation) Regulations Planning
TENNESSEE		
Covington, James W.	1205 Wilmore Road Memphis, TN 38117 (901) 767-5736	Technical Assistance Training
Knight, Wendell M. President	Environmental and Safety Designs, Inc. (EnSafe) P.O. Box 34207 Memphis, TN 38134 (901) 372-7962	Hazardous Material: Planning, Training Programs Fire and Industry: Technical Assistance
Myers, Steven H. Environmental Control Supervisor	Aluminum Company of America Alcoa, TN 37701 (615) 977-3071	Technical Assistance Response
White, Harry E. Captain, Hazardous Materials Team	Nashville Fire Department 500 Second Avenue North Nashville, TN 37201 (615) 259-5423 (615) 327-1300 (Dispatcher)	Training Response
Wick, James A. Safety, Health, and Environmental Manager	E.I. Dupont Company P.O. Box 27038 Memphis, TN 27038 (901) 353-7100 (day) (901) 353-7123 (night) (901) 357-1546 (cyanide hotline)	Response Cyanide
TEXAS		
Anderson, S.E. Chairperson	Channel Industries Mutual Aid Association c/o Rohm and Haas Texas, Inc. P.O. Box 672 Deer Park, TX 77536 (713) 479-2861	Technical Assistance
Manager of Health and Safety	Shell Oil Company P.O. Box 2099 Houston, TX 77001 (713) 241-2822	Oil Products (Fuel) Emergency Response
Manager, Emergency Response-Oil	Shell Oil Company P.O. Box 2099 Houston, TX 77001 (713) 241-3996	Crude Oil Spills (Harbor and Rivers)

Contact	Agency	Areas of Expertise
Ward, C.J. Manager, Transportation, Safety, and Regulations	Shell Oil Company P.O. Box 2099 Houston, TX 77001 (713) 241-2489	Chemical and Liquefied Petroleum Products Information
VERMONT		
Cashman, John R. Writer, Editor, Publisher	Rural Delivery 2 Sterling Hill Barre, VT 05641 (802) 479-2307	Resource Identification Information Referral
DiVincenzo, Gerry Oil and Hazardous Materials Specialist	Hazardous Materials Management Section Department of Water Resources and Environmental Engineering State Office Building Montpelier, VT 05602 (802) 828-3395 (802) 828-3100 (Dispatcher)	Technical Assistance
Malter, John A. Chief	Hazardous Materials Management Section Department of Water Resources and Environmental Engineering State Office Building Montpelier, VT 05602 (802) 828-3395 (802) 828-3100 (Dispatcher)	Technical Assistance
Peterson, Charles President	New England Marine Contractors 1 Mill Street Burlington, VT 05401 (802) 658-1441	Oil Spill and Hazardous Waste Cleanup Transportation
Bill Barry	Department of Public Safety Civil Defense Division 132 State Street Montpelier, VT 05602 (802) 828-2163 (802) 828-3100 (Dispatcher)	Technical Assistance Training
VIRGINIA		
Mesaris, Gary Captain	Fairfax County Fire and Rescue Department 4600 West Ox. Road Fairfax, VA 22030 (703) 691-3164	Training Response Operations
Marcus, Charles B. Captain	Arlington County Fire Department 1900 South Walter Reed Drive Arlington, VA 22204 (703) 558-2909	Training

Contact	Agency	Areas of Expertise
Sharp, Ronald M. Supervisor, Hazardous Materials	Norfolk and Western Railway Company 8 North Jefferson Street Roanoke, VA 24042 (703) 981-5353	Training Response Regulations
Walters, William F.	Washington Gas Light Company 6801 Industrial Road Springfield, VA 22151 (703) 750-4232 (O) (301) 762-2081 (H)	Propane and Natural Gas Technical Assistance Response Training Hazardous Materials Response and Training
WASHINGTON		
Hedberg, Gary R. Fire Chief	Bellingham Fire Department Suite C4 1800 C Street Bellingham, WA 98225 (206) 676-6813	Technical Assistance
McAllister, Kenneth Battalion Chief	Bellevue Fire Department 666 Bellevue Way, S.W. Bellevue, WA 98004 (206) 455-6892	Risk Analysis
FEDERAL		
Craig, Jim Training Instructor	National Emergency Training Center National Fire Academy Emmitsburg, MD 21727 (800) 638-9600, Ext. 6087	Training
MILITARY		
Brown, Jerry M. Ph.D. Director of International Health Affairs	Office of Assistant Secretary of Defense (Health Affairs) Pentagon, Room 3E279 Washington, DC 20301 (202) 694-4157	Biological and Chemical Agents
Stutz, D.R., Ph.D. Lieutenant Colonel, Medical Service Corps Coordinator, Emergency Medicine	Uniformed Services University of the Health Sciences Room 2060 4301 Jones Bridge Road Bethesda, MD 20814 (301) 295-3722	Training, Emergency Medical Services
CANADA/ONTARIO		
Burrows, Douglas K. Chief of Police	Peel Regional Police Force Box 7750 7750 Hurontario Street Brampton, Ontario L6V 3W6 (416) 453-3311	Evacuation Planning

Environmental Protection Agency Regions

The Resource Conservation and Recovery Act mandated the Environmental Protection Agency (EPA) to deal with hazardous wastes and to set up EPA regions. Following is a list of the ten regions, mailing addresses for regional EPA offices, and the appropriate hazardous waste contact person for each region.

EPA REGIONS AND CONTACTS

EPA Region	Area Served	Notification Mailing Address	Hazardous Waste Contact
I	Connecticut, Maine, Massachusetts, Rhode Island, Vermont, New Hampshire	EPA Region I Permits Branch P.O. Box 8748 Boston, MA 02114	Ira Leighton Hazardous Waste Program (617) 223-1591
II	New Jersey, New York, Virgin Islands, Puerto Rico	EPA Region II Information Service Center 26 Federal Plaza New York, NY 10007	Dr. Ernest A. Regna Solid Waste Section (212) 264-0504/5
III	Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, West Virginia	EPA Region III P.O. Box 1480 Philadelphia, PA 19107	Robert L. Allen Waste Management Branch (215) 597-0980
IV	Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee	EPA Region IV RCRA Activities 345 Courtland, N.E. Atlanta, GA 30308	John E. Dickinson Hazardous Waste Section (404) 881-3016
V	Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin	EPA Region V RCRA Activities P.O. Box 7861 Chicago, IL 60680	Karl J. Klepitsch Waste Management Branch 111 W. Jackson St. 16th Floor Chicago, IL 60604 (312) 886-7435 800-572-3176 (IL) 800-621-3192 (IN, MI, MN, OH, WI)
VI	Arkansas, Louisiana, New Mexico, Oklahoma, Texas	EPA Region VI Attn: 6 AEP 1201 Elm St. First International Bldg. Dallas, TX 75270	Ms. Pat Hull State Programs Section (214) 767-2645
VII	Iowa, Kansas, Missouri, Nebraska	EPA Region VII P.O. Box 15606 Kansas City, MO 64106	Chet McLaughlin Hazardous Waste Management Section (816) 374-6534 800-892-3837 (MO) 800-821-3714 (IA, KS, NE)

EPA Region	Area Served	Notification Mailing Address	Hazardous Waste Contact
VIII	Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming	EPA Region VIII 8AH—WM (ON) 1860 Lincoln St. Denver, CO 80295	Jon P. Yeager Solid Waste Section (303) 837-2221 800-332-3321 (CO) 800-525-3022 (MT, ND, SD, UT, WY)
IX	Arizona, California, Hawaii, Nevada, Guam, American Samoa, Commonwealth of Northern Marianas	EPA Region IX Attn: A—3—2 215 Freemont St. San Francisco, CA 94105	Laura Yoshii State Programs Section (415) 974-8127
X	Alaska, Idaho, Oregon, Washington	EPA Region X M/S 530—A 1200 Sixth Ave. Seattle, WA 98101	Tobias A. Hegdahl Solid Waste Program (206) 442-2808 800-542-0841 (WA) 800-426-0663 (AK, ID, OR)

State Solid and Hazardous Waste Agencies

The names of firms licensed to collect, store, and/cr dispose of hazardous waste are available from state environmental protection agencies. Contact the agency in your state listed here for the names of firms licensed to deal with hazardous waste in your state.

Alabama
Alfred S. Chipley, Director
Division of Solid Waste Management
Dept. of Public Services
434 Monroe St.
Montgomery 36130
(205) 832-6728

Alaska
Stan Hungerford
Air & Solid Waste Management
Dept. of Environmental Conservation
Pouch O
Juneau 99811
(907) 465-2635

American Samoa
Pati Faiai, Executive Secretary
Environmental Quality Commission
American Samoa Government
Pago Pago 96799
(633-4116)

Randy Morris, Deputy Director
Dept. of Public Works
Pago Pago 97699

Arizona
Barry Abbott, Director
Dept. of Health Services
State Health Building, Room 202
1740 Adams St.
Phoenix 85007
(602) 255-1162

Arkansas
Jarrell Southall, Director
Dept. of Pollution
Control and Ecology
P.O. Box 9583
8001 National Dr.
Little Rock 72219
(501) 562-7444

Ed Davis, Energy Administrator
Biomass and Resource Recovery
Program
Dept. of Energy
Number 1 State Capitol Mall
Little Rock 72201
(501) 371-1370

California
Peter Rogers, Acting Chief
Hazardous Waste Management Branch
Dept. of Health Services
744 P St.
Sacramento 95814
(916) 322-2308

Colorado
Kenneth Waesche, Director
Waste Management Division
Colorado Dept. of Health
4210 E. 11th Ave.
Denver 80220
(303) 320-8333

Orville Stoddard, Deputy Director
Waste Management Division
Colorado Dept. of Health
4210 E. 11th Ave.
Denver 80220
(303) 320-8333

Commonwealth of North Mariana Islands
George Chan, Administrator
Division of Environmental Quality
Dept. of Public Health and Environmental Services
Commonwealth of the North Mariana Islands
Saipan, Mariana Islands 96950
Overseas Operator: 6984
Cable address: GOV. NMI Saipan

Connecticut
Charles Kurker, Director
Solid Waste Management Protection
Dept. of Environmental Protection
State Office Building
165 Capitol Ave.
Hartford 06115
(203) 566-5712

Stephen Hitchcock, Director
Hazardous Materials Management Unit
Dept. of Environmental Protection
State Office Building
165 Capitol Ave.
Hartford 06106
(203) 566-5712

Patrick Bowe, Acting Chief
Hazardous Waste Section
Dept. of Environment Protection
State Office Building
165 Capitol Ave.
Hartford 06106
(203) 566-5712

Michael Cawley
Connecticut Resource Recovery Authority
179 Allyn St., Suite 603
Professional Building
Hartford 06103
(203) 549-6390

Delaware
Kenneth R. Weiss, Supervisor/Resource Engineer
Solid Waste Management Section
Dept. of Natural Resources and Environmental Control
Edward Tatnall Building
P.O. Box 14011, Room 203
Blue Hen Mall
Dover 19901
(302) 736-4781

District of Columbia
Angelos Tompros, Chief
Division of Pesticides and Hazardous Materials
Dept. of Environmental Sciences
5000 Overlook Ave., SW
Washington, DC 20032
(202) 767-8181

Florida
Robert W. McVety, Administrator
Solid Waste Section
Dept. of Environmental Regulations
Twin Towers Office Building
Room 421
2600 Blair Stone Rd.
Tallahassee 32301
(904) 488-0300

Georgia
Moses N. McCall, III, Chief
Land Protection Branch
Environmental Protection Division
Dept. of Natural Resources
270 Washington St., SW, Room 822
Atlanta 30334
(404) 656-2833

Guam
James Branch, Deputy Administrator
EPA, Government of Guam
P.O. Box 2999
Agana 96910
(646-8863)

Hawaii
Melvin Koizumi, Deputy Director
Environmental Health Division
Dept. of Health
P.O. Box 3378
Honolulu 96801
(808) 548-4139

Ralph Yukumoto
Environmental Health Division
Dept. of Health
P.O. Box 3378
Honolulu 96801
(808) 548-6410

Idaho
Robert Olson, Supervisor
Hazardous Materials Bureau
Dept. of Health and Welfare
State House
Boise 83720
(208) 334-4064

Illinois
Robert Kuykendall, Director
Division of Land and Noise
Pollution Control
Environmental Protection Agency
2200 Churchill Rd., Room A-104
Springfield 62706
(217) 782-6760

Indiana
David Lamm, Director
Land Pollution Control Division
State Board of Health
1330 Michigan St., Room A-304
Indianapolis 46206
(317) 633-0194

Iowa
Charles C. Miller, Director
Air and Land Quality Division
Dept. of Environmental
Quality
Henry A. Wallace Building
900 E. Grand Street, 3rd floor
Des Moines 50319
(515) 281-8853

Kansas
Howard Duncan, Director
Bureau of Environmental
Sanitation
Dept. of Health and Environment
Forbes Field, Building 321
Topeka 66620
(913) 862-9360, Ext. 290

Kentucky
Alex Barber, Director
Division of Waste Management
Bureau of Environmental Protection
Dept. for Natural Resources and
Environmental Protection
18 Reilly Rd.
Frankfort 40601
(502) 564-6716

Louisiana
John Koury, Administrator,
Solid Waste Division
Dept. of Natural Resources
P.O. Box 44396
Baton Rouge 70804
(504) 342-1227

Gerald D. Healy, Jr., Administrator
Hazardous Waste Division
Dept. of Natural Resources
P.O. Box 44066
Baton Rouge 70804
(504) 342-1227

Maine
Steve Groves, Acting Chief
Bureau of Oil and Hazardous
Waste Materials
Dept. of Environmental Protection
State House, Station 17
Augusta 04333
(207) 289-2111

Jack Krueger, Director
Licensing and Enforcement Division
Bureau of Oil and Hazardous Waste
Materials
Dept. of Environmental Protection
State House, Station 17
Augusta 04333
(207) 289-2251

Maryland

Bernard Bigham
Waste Management Administration
Dept. of Health and
Mental Hygiene
201 W. Preston St., Room 212
Baltimore 21201
(301) 383-5740

Fred Sachs, Chief
Hazardous Waste Division
Waste Management Administration
Dept. of Health & Mental Hygiene
201 W. Preston St.
Baltimore 21201
(301) 383-5743

Ronald Nelson, Director
Waste Management Administration
Office of Environmental Programs
Dept. of Health & Mental Hygiene
201 W. Preston St., Room 212
Baltimore 21201
(301) 383-3123

Massachusetts

John Shortsleeve, Director
Bureau of Solid Waste Disposal
Dept. of Environmental Management,
Room 1905
Leverett Saltonstall Building
100 Cambridge St.
Boston 02202
(617) 727-4293

(Solid & Hazardous Waste Regulatory)
William Cass, Director
Division of Hazardous Waste
Dept. of Environmental Quality
Engineering
1 Winter St.
Boston 02110
(617) 292-5500

Michigan

Gary Guenther, PE, Chief
Environmental Protection Bureau
Dept. of Natural Resources
Box 30028
Lansing 48909
(517) 373-7917

Fred Kellow, Division Chief
Resource Recovery Division
Dept. of Natural Resources
Westland Plaza
Lansing 48909
(517) 373-0540

Allan Howard, Chief
Office of Hazardous Waste Management
Environmental Services Division
Dept. of Natural Resources
Box 30028
Lansing 48909
(517) 373-2730

(Hazardous Waste, Liquid)
David Dennis, Chief
Oil & Hazardous Materials
Control Section
Water Quality Division
Dept. of Natural Resources
Box 30028
Lansing 48909
(517) 373-2794

(Hazardous Waste, Toxic or
Critical Materials)
Delbert Rector, Chief
Environmental Services Division
Dept. of Natural Resources
Box 30028
Lansing 48909
(517) 373-3560

John L. Hesse, Chief
Chemicals and Health Center
Michigan Dept. of Public Health
Box 30035
Lansing 48909
(517) 373-8050

Minnesota

Dale L. Wikre, Director
Solid and Hazardous Waste Division
Pollution Control Agency
1935 County Rd., B-2
Roseville 55113
(612) 297-2735

Mississippi

Jack M. McMillan, Director
Division of Solid Waste
Management
Bureau of Pollution Control
Dept. of Natural Resources
P.O. Box 10385
Jackson 39209
(601) 961-5171

Missouri
Dave Bedan, Ph.D.
Director, Waste Management Program
Dept. of Natural Resources
State Office Building
P.O. Box 1368
Jefferson City 65102
(314) 751-3241

Montana
Duane L. Robertson, Chief
Solid Waste Management Bureau
Dept. of Health and Environmental Sciences, Cogswell Bldg., Room A201
Helena 59602
(406) 449-2821

Nebraska
Robert Wall, Chief
Water and Waste Management Division
Dept. of Environmental Control
State House Station
P.O. Box 94877
Lincoln 68509
(402) 471-2186

Nevada
Lewis H. Dodgion, Administrator
Division of Environmental Protection
Dept. of Conservation and Natural Resources
Capitol Complex
Carson City 89701
(702) 885-4670

Verne Rosse
Waste Management Program Director
Division of Environmental Protection
Dept. of Conservation and Natural Resources
Capitol Complex
Carson City 89701
(702) 885-4670

New Hampshire
Tom Sweeney, Chief
Bureau of Solid Waste
Dept. of Health and Welfare
Health and Welfare Building
Hazen Dr.
Concord 03301
(603) 271-4608

New Jersey
Lino F. Pereira, Director
Solid Waste Administration
Division of Environmental Quality
Dept. of Environmental Protection
32 E. Hanover St.
Trenton 08625
(609) 292-9877

New Mexico
Jon Thompson, Chief
Community Support Services Bureau
Environmental Improvement Division
N.M. Health and Environment Dept.
P.O. Box 968
Santa Fe 87504
(505) 827-5271, Ext. 272

Ray Sisneros, Program Manager
PEM Section, Community Services Bureau
Environmental Improvement Division
N.M. Health and Environment Dept.
P.O. Box 968
Santa Fe 87504
(505) 827-5271, Ext. 272

New York
Norman H. Nosenchuck, Director
Division of Solid Waste
Dept. of Environmental Conservation
50 Wolf Rd., Room 209
Albany 12233
(518) 467-3254

North Carolina
O.W. Strickland, Head
Solid & Hazardous Waste Management Branch
Division of Health Services
Dept. of Human Resources
P.O. Box 2091
Raleigh 27602
(919) 733-2178

North Dakota
Jay Crawford, Director
Division of Environmental Waste Management and Research
Dept. of Health
1200 Missouri Ave., 3rd floor
Bismarck 58505
(701) 224-2366

Ohio
Donald E. Day, Chief
Office of Land Pollution Control
Environmental Protection Agency
P.O. Box 1049
Columbus 43216
(614) 466-8934

Chuck Wilhelm, Chief
Office of Hazardous Materials Management
Ohio EPA
P.O. Box 1049
Columbus 43216
(614) 466-7220

Oklahoma
H. A. Caves, Chief
Industrial and Solid Waste Services
Dept. of Health
P.O. Box 53551
1000 NE 10th St., Room 803
Oklahoma City 73152
(405) 271-5338

Oregon
Ernest A. Schmidt, Administration
Solid Waste Management Division
Dept. of Environmental Quality
P.O. Box 1760
522 SW Fifth Ave.
Portland 97207
(503) 229-5913

Pennsylvania
Donald A. Lazarchik
Bureau of Solid Waste Management
Dept. of Environmental Resources
Fulton Building, 8th floor
P.O. Box 2063
Harrisburg 17120
(717) 787-7383

Puerto Rico
Santos Rohena, Jr.
Office of the Governor
Environmental Quality Board
Box 11488
Santurce 00910-1488
(809) 725-2062, 725-5140

Rhode Island
John S. Quinn, Jr., Chief
Solid Waste Management Program
Dept. of Environmental Management
204 Cannon Building
75 Davis St.
Providence 02908
(401) 277-2797

South Carolina
Hartsill W. Truesdale, Director
Bureau of Solid and Hazardous Waste Management
Dept. of Health and Environmental Control
J. Marion Simms Building
2600 Bull St.
Columbia 29201
(803) 758-5681

Robert E. Malpass, Chief
Bureau of Solid and Hazardous Waste Management
S.C. Dept. of Health and Environmental Control
J. Marion Simms Building
2600 Bull St.
Columbia 29201
(803) 758-5681

South Dakota
Joel C. Smith, Director
Division of Environmental Health
Dept. of Health
Joe Foss Building
Pierre 57501
(605) 773-3329

WE WANT TO KNOW . . .
if a name, an address, or a phone number has changed; if there's an upcoming event, a new program or course, a new publication being offered. If you have more current information than is contained in this *Almanac*, know something that should be included in this book, or just have something interesting about the fire protection scene that you want to contribute, please let us know. Write: Editor, *Fire Almanac*, NFPA, Batterymarch Park, Quincy, MA 02269. All suggestions will receive our careful attention.

Tennessee
Tom Tiesler, Director
Division of Solid Waste Management
Bureau of Environmental
Services
Tennessee Dept. of Public Health
150 9th Ave., N
Nashville 37203
(615) 741-3424

Texas
Jack Carmichael, Director
Bureau of Solid Waste Management
Texas Dept. of Health
1100 W. 49th St., T-602
Austin 78756
(512) 458-7271

Jay Snow, Chief
Industrial Solid Waste Section
Texas Dept. of Water Resources
1700 N. Congress, Room 237-1
P.O. Box 13087, Capitol Station
Austin 78711
(512) 475-2041

Utah
Dale Parker, Director
Bureau of Solid and Hazardous
Waste Management
Dept. of Health
P.O. Box 2500
150 W. North Temple
Salt Lake City 84110
(801) 533-4145

Vermont
Richard A. Valentinetti, Chief
Air and Solid Waste Programs
Agency of Environmental Conservation
State Office Building
P.O. Box 489
Montpelier 05602
(802) 828-3395

Virgin Islands
Francine Lang, Director
Division of Natural Resources
Management
Dept. of Conservation and
Cultural Affairs
P.O. Box 4340, Charlotte Amalie
St. Thomas 00801
DC Overseas Operator 472-6620
(809) 774-6420

Virginia
William F. Gilley, Director
Division of Solid and Hazardous
Waste Management
Virginia Dept. of Health
Madison Building
109 Governor St.
Richmond 23219
(804) 786-5271

Washington
Earl Tower, Supervisor
Solid Waste Management Division
Dept. of Ecology
Olympia 98504
(206) 753-6317

West Virginia
John Northeimer
Division of Natural Resources
Dept. of Natural Resources
1201 Greenbrier St.
East Charleston 25311
(304) 348-5935

Wisconsin
Robert Krill, Director
Bureau of Solid Waste Management
Dept. of Natural Resources
P.O. Box 7921
Madison 53707
(608) 266-1327

Wyoming
Charles Porter, Supervisor
Solid Waste Management Program
Dept. of Environmental Quality
Equality State Bank Building
401 W. 19th St.
Cheyenne 82002
(307) 777-7752

Spill Control Association of America

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Under the umbrella of the Spill Control Association of America (SCAA), there are a number of firms in the United States that specialize in hazardous materials spills cleanup.

The SCAA, based in Southfield, Michigan, has begun work with the American Society of Testing and Materials to develop standards for emergency response, clean-up procedures, and contractor qualifications.

The spill contractor members of SCAA have established a Contractor's Code of Ethics to:

> Pledge ourselves to advertise our services and equipment in an honest and dignified manner based upon a true cost plus a fair and reasonable profit;
>
> Pledge ourselves to advertise our services and equipment truthfully so as to fully inform our customers as to what they should expect by way of performance and cost;
>
> Pledge ourselves to work harmoniously with all those concerned with the clean-up and control of the spilled oil or hazardous substance to assure an organized and cost-effective job for our customers.

SCAA Membership List

Following is a membership list of the Spill Control Association of America (SCAA):

Ace Oil Service, Inc.
Robert L. Fondessy
876 Otter Creek Rd.
Oregon, OH 43616
(419) 726-1521

ACME Services, Inc.
Donald E. Turner
985 Plainfield St.
Johnson, RI 02919
(401) 944-3600

ACME Products Co.
L.H. Stanfield
P.O. Box 51388
Tulsa, OK 74151
(918) 836-7184

Air Oil, Inc.
D.L. "Dave" Bloodworth
900 Commerce Rd., E, Ste. 105
Harahan, LA 70123
(504) 733-FAST/773-7182

Albany International Corp.
Peter Lane
1400 Clinton St.
P.O. Box 1062
Buffalo, NY 14240
(716) 824-8484

All Points Associates, Inc.
Thomas L. Osborne
4301 Midfield Way
Fairfax, VA 22030
(703) 378-7000

Alsthom Atlantic, Inc.
Pollution Control Dept.
Dr. Jacques Pichon
600 Carondelet St., Ste. 208
New Orleans, LA 70130
(504) 529-1695/529-1696

American Boom & Barrier Corp.
Randy O'Brian
P.O. Box 933
Port Canaveral, FL 32920
(305) 784-2110

American Marine, Inc.
James L. Pearce
401 Shearer Blvd.
Cocoa, FL 32922
(305) 636-5783

American Petroleum Institute
Thomas Nanney
2101 L St., NW
Washington, DC 20037
(202) 457-7077

Bay West, Inc.
Ms. Rondi Erickson
517 S. 59th Ave., W
Duluth, MN 55807
(218) 628-1093

BP Engineering Associates, Inc.
Mathew E. Connor
9149 E. Jefferson Ave.
Detroit, MI 48214
(313) 821-4900

BP North America Trading, Inc.
Mr. C.R. Batty
620 Fifth Ave.
New York, NY 10020
(212) 399-0600

Bridgestone Research, Inc.
Hiroshi Kawakaml
350 5th Ave.
New York, NY 10001
(212) 736-5590

M.B. Buettner & Co./Midwest
Arthur Judson
Mailing address: P.O. Box 260-A
Detroit, MI 48232
(313) 259-0200

Calgon Corporation
Jay D. Crail
P.O. Box 1346
Pittsburgh, PA 15230
(412) 777-8000

Cannon's Engineering Corp.
Scott Cannon
350 Main St.
W. Yarmouth, MA 02673
(617) 775-2800

Cecos International
Stanley C. Zawadzki, Jr.
P.O. Box 619
Niagara Falls, NY 14032
(716) 731-3281

Chevron U.S.A., Inc.
William R. Leek, Specialist
555 Market St.
San Francisco, CA 94150
(415) 894-2107

Clark-Cutler-McDermott Co.
James Almone, Jr.
P.O. Box 269
Franklin, MA 02038
(617) 528-1200

Clean Venture
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Synopsis of State Regulations for Hazardous Waste

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Alabama

Relationship to Federal Regulations

On February 25, 1982, Alabama received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in Alabama are now subject to the Alabama hazardous waste management regulations in lieu of the Phase I Federal regulations adopted by EPA.

Alabama has for the most part adopted the EPA regulations, so persons familiar with the rules in 40 *CFR* Parts 260-265 should have little trouble with the Alabama regulations.

In three instances, Alabama has taken advantage of the opportunity to adopt rules that are "more stringent" than the Federal regulations.

State Law

The Alabama Hazardous Wastes Management Act of 1978 authorizes the development of a hazardous waste management program in Alabama. The law is also referred to as Act 129 of 1978. The act requires that the State Board of Health promulgate rules and regulations to insure compliance with the statute.

Alaska

Relationship to Federal Regulation

Alaska is operating under a Cooperative Arrangement with the U.S. Environmental Protection Agency (EPA) to administer the Federal hazardous waste management program in that State.

Alaska is currently drafting State hazardous waste management regulations, hopes to have them in place in September 1982. At that time it will be in a position to apply for Phase I interim authorization and perhaps Phase II interim authorization.

State Law

The development of a hazardous waste management program in Alaska is authorized by Alaska Statutes (AS) 46.03.020(10) (A), (E), and (H) and (AS) 46.03.710.

Arizona

Relationship to Federal Regulations

Arizona applied for Phase I interim authorization from the Environmental Protection Agency (EPA) on the basis of emergency amendments to its hazardous waste management regulations. However, these amendments were not carried through to completion, thus the application was put on hold.

Arizona has now resolved the problem; amendments were put into effect on October 14, 1981, and the State has asked EPA to again actively consider the application. Phase I interim authorization should be granted in early 1982.

The general approach of the Department of Health Services is to obtain interim authorization, make the necessary programmatic changes, then subsequently apply for full authorization.

The emergency amendments have brought the Arizona regulations more closely in line with the Federal program. However, in several instances, Arizona has chosen to be "more strigent" than the Federal requirements.

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State Law

Legislation concerning hazardous waste management is scattered throughout various articles of Arizona law.

Arkansas

Relationship to Federal Regulations

On November 19, 1980, Arkansas received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program. Arkansas was the first state in the nation to obtain this designation.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in Arkansas are now subject to the Arkansas hazardous waste management regulations in lieu of the Federal hazardous waste regulations adopted by EPA.

Arkansas has adopted by reference all of the EPA regulations found in Parts 260-267 and 122 and 124 of Title 40 of the *Code of Federal Regulations* (*CFR*), as well as adopting numerous additional "more stringent" regulations that meet the specific needs of the State.

State Law

The principal piece of legislation authorizing the establishment of a hazardous waste management program is the Arkansas Hazardous Waste Management Act (Act 406 of 1979). A secondary law concerning aspects of hazardous waste management is the Arkansas Resource Reclamation Act (Act 1098 of 1979).

California

Relationship to Federal Regulations

On June 4, 1981, California received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in California are now subject to the California hazardous waste management regulations in lieu of the Phase I Federal hazardous waste regulations adopted by EPA.

Although California's regulations are distinctly different from the Federal regulations found in 40 *CFR* Parts 260-265, EPA has determined that they are "substantially equivalent" to the Federal regulations. However, in order to receive Phase I final authorization, California's regulations must be "equivalent" to the Federal regulations, and California must make substantial changes in its regulations.

State Law

The California Hazardous Waste Control Law of 1972, as amended, authorizes the establishment of a hazardous waste management program. This law has been amended several times, including 1980 when major changes were made to obtain Phase I interim authorization, and, more recently, in September 1981 when additional amendments were enacted by the California Legislature.

The law which governs the activities of the SWRCB is the Porter-Cologne Water Quality Control Act of 1969, as amended.

Colorado

Relationship to Federal Regulations

Colorado is currently operating under a Cooperative Arrangement with the Environmental Protection Agency (EPA) to administer the Federal hazardous waste management program in Colorado.

The State Department of Health plans to seek interim and full authorization to operate its own program sometime after July 1982. The Colorado program will be equivalent to, but not more stringent than, the Federal program.

Any manifest meeting the EPA information requirements is sufficient in Colorado.

State Law

The Hazardous Waste Act of 1981 was signed into law in late June 1981, and allows the State Department of Health to:

- Until July 1982, become involved in siting hazardous waste disposal facilities;
- After July 1983, seek interim and final authorization to administer its own hazardous waste management program in Colorado.

Connecticut

Relationship to Federal Regulations

Connecticut has submitted a final Phase I interim authorization application to the U.S. Environmental Protection Agency (EPA) and authorization is expected sometime in 1982.

Until Connecticut receives Phase I interim authorization, generators, transporters and owners/operators of treatment, storage and disposal (TSD) facilities will be subject to two sets of hazardous waste management regulations—the EPA regulations found in 40 *CFR* Parts 260-265 and 122 and 124, and the Connecticut regulations found in Sections 25-54cc(c)-1 through 50, of the Regulations of Connecticut State Agencies.

When and if Connecticut receives Phase I interim authorization, the Connecticut regulations will be in effect in that state in lieu of the Federal hazardous waste management regulations.

Connecticut has adopted regulations which are nearly identical to the Federal regulations, with four "more stringent" requirements.

State Laws

Two laws have been enacted by the General Assembly dealing with hazardous waste management.

The first, Public Act 79-605, authorizes the Department of Environmental Protection to adopt and enforce hazardous waste management regulations. This authorization is found in Section 25-54cc(c) of the Act.

The second, Public Act 81-369, deals with siting of hazardous waste facilities, and ensures public particiption in the siting process.

Delaware

Relationship to Federal Regulations

On February 25, 1982, Delaware received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in Delaware are now subject to Delaware hazardous waste management regulations in lieu of the Phase I regulations adopted by EPA.

With one exception, Delaware has chosen to adopt by reference all of the EPA Phase I regulations adopted on May 19, 1980. The lone exception is the manifest system, which is "more stringent" than the Federal requirements.

In the future the Department of Natural Resources and Environmental Control will propose action on the amendments to the Federal regulations which were adopted from May 19, 1980, through August 1981. Some of these requirements may be "more stringent" than the Federal regulations.

State Law

The Hazardous Waste Management Act of 1980 authorizes the establishment of a hazardous waste management program in Delaware. (7 Del. C. Chapter 63.)

District of Columbia

Relationship to Federal Regulations

The District of Columbia is operating under a Cooperative Arrangement with the U.S. Environmental Protection Agency (EPA) to administer the Federal hazardous waste management program in D.C.

The District hopes to have its regulations in place in mid-summer, 1982, which will put the District in the position of applying to EPA for Phase I and Phase II interim authorization in late summer, 1982.

State Law

The Hazardous Waste Management Act of 1977 authorizes the development of a hazardous waste management program in the District of Columbia.

Florida

Relationship to Federal Regulations

Florida has not sought interim authorization from the Environmental Protection Agency (EPA) and therefore the Federal hazardous waste management regulations are in effect and being implemented in Florida.

Florida has entered into a Cooperative Arrangement with EPA for FY 1981, and intends to enter into a similar arrangement in FY 1982.

This arrangement is intended to serve as an effective integration of administrative, inspection, and enforcement efforts under the Federal hazardous waste management program and the laws of Florida. The Cooperative Arrangement was developed to assure efficient allocation of public funds to minimize duplication of effort, to avoid confusion in the regulated community, and to expedite the Federal hazardous waste management system under RCRA.

In accordance with the conditions of the Cooperative Arrangement, EPA retains full and ultimate responsibility for the administration and enforcement of the Federal hazardous waste management program in Florida. The State's participation is intended to maximize the efficient implementation of RCRA and to speed the State's receipt of interim and/or final authorization.

It is tentatively proposed that Florida will apply for interim authorization during 1982.

State Law

Florida Resource Recovery and Management Act of 1980; effective on October 1, 1980.

Georgia

Relationship to Federal Regulations

On February 3, 1981, Georgia received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in Georgia are now subject to the Georgia hazardous waste management regulations in lieu of the Phase I regulations adopted by EPA.

Georgia has basically adopted all the EPA regulations, including all amendments to the regulations through February 13, 1981. There are no parts of the Georgia regulations that are "more stringent" than the Federal requirements.

State Law

The Hazardous Waste Management Act of 1979 authorizes a hazardous waste management program in Georgia. The Hazardous Waste Management Authority Act of 1981 authorizes the Authority to construct, operate, and/or lease one or more hazardous waste facilities in Georgia.

Hawaii

Relationship to Federal Regulations

Hawaii is operating under a Cooperative Arrangement with the U.S. Environmental Protection Agency (EPA) to administer the Federal hazardous waste management program at this time.

Hawaii probably will not seek interim authorization from EPA, unless directed to do so by the State Legislature.

State Law

The Hawaii Statute on Environmental Quality (Chapter 342, Hawaii Revised Statutes) authorizes the development of a solid waste management program in Hawaii.

Draft changes to the law dealing with hazardous waste will be submitted to the next session of the Hawaii Legislature.

Idaho

Relationship to Federal Regulations

Idaho is currently operating under a Cooperative Arrangement with the Environmental Protection Agency (EPA) to administer the Federal hazardous waste management program in Idaho.

The Department of Health and Welfare intends to seek full authorization from EPA if the State Legislature passes enabling legislation in the January 1983, session.

The Idaho hazardous waste management program will be equivalent to and onsistent with the Federal program.

Any manifest meeting the EPA information requirements is sufficient in Idaho.

State Law

None has been adopted at this time.

Illinois

Relationship to Federal Regulations

Illinois has applied to the U.S. Environmental Protection Agency (EPA) for Phase I interim authorization to operate its own hazardous waste management program in lieu of the EPA Phase I program. Interim authorization is expected in 1982.

Until Illinois receives Phase I interim authorization, generators, transporters and owners/operators of treatment, storage and disposal (TSD) facilities will be subject to two sets of regulations—those adopted by EPA and those adopted by the Illinois Pollution Control Board.

Recognizing the problem, Illinois has tried to make certain accommodations that will lessen the impact on the regulated community.

One of the accommodations has been the adoption of Part 700: Outline of Waste Disposal Regulations. The intent of that part is that a person familiar with the EPA rules should be able to understand the essential peculiarities of the Illinois system by reading only Part 700.

Essentially, what Illinois has done is retain its existing regulations in Chapter 7 (Solid Waste) and Chapter 9 (Special Waste Hauling Regulations), while adopting regulations that are "identical in substance" with the EPA regulations in order for the State to receive Phase I interim authorization.

This process has produced a system that is "identical in substance" to the EPA regulations, but at the same time has some provisions that are "more stringent" than the EPA rules.

State Law

The Illinois Environmental Protection Act of 1970, as significantly amended in 1975, 1979 and 1981, authorizes the development of a hazardous waste management program in Illinois.

Indiana

Relationship to Federal Regulations

Indiana has applied to the U.S. Environmental Protection Agency (EPA) for Phase I interim authorization.

Until Phase I interim authorization is received, Indiana generators, transporters, and owners/operators of treatment, storage and disposal (TSD) facilities will be subject to two sets of equal regulations—the EPA regulations found in 40 *CFR* Parts 260-265, and the Indiana regulations found in Article 4 of 320 Indiana Administrative Code (IAC).

However, that should not be a problem because Indiana has essentially adopted the EPA regulations and amendments to those regulations through January 16, 1981. The only exception is that Indiana has "more stringent" requirements for small quantities of hazardous waste.

State Law

The Indiana Environmental Management Act, as amended, gives the Indiana Environmental Management Board the authority to "regulate and require the proper and safe transportation, treatment, storage, and disposal of any hazardous waste that is generated in or transported into this State."

Iowa

Relationship to Federal Regulations

On January 26, 1981, Iowa received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in Iowa are now subject to the Iowa hazardous waste management regulations in lieu of the Federal hazardous waste regulations adopted by EPA.

The practical effect of Iowa receiving interim authorization is negligible. That's because Iowa has adopted by reference the EPA hazardous waste regulations. Thus, one familiar with the Federal hazardous waste regulations will also be familiar with Iowa's.

Iowa has adopted all EPA hazardous waste regulations and amendments through January 23, 1981. This also means that Iowa has adopted by reference EPA's Phase II, Components A and B regulations concerning permitting standards for tanks, container storage facilities, piles, storage surface impoundments, and incinerators. However, Iowa has yet to apply for, and receive, Phase II, Components A and B interim authorization. Thus, EPA retains the authority to enforce the regulations for these facilities.

State Law

The Iowa Hazardous Waste Management Act of 1979, as amended, authorizes the development of a hazardous waste management program in Iowa.

Section 11 of the Act requires that Iowa's regulations "be consistent with and not exceed" the Federal regulations.

Kansas

Relationship to Federal Regulations

On September 21, 1982, Kansas received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in Kansas are now subject to the Kansas hazardous waste management regulations in lieu of the Federal hazardous waste regulations adopted by EPA.

Kansas received Phase I interim authorization on the basis of regulations that went into effect on April 10, 1981. These rules have since been "cleaned up," and the new set of regulations went into effect as "temporary" regulations on November 4, 1981. By State law, these regulations became "final" regulations on May 1, 1982.

Kansas has adopted the Federal regulations promulgated or which will be promulgated through May 1, 1982, as well as several "more stringent" requirements to meet State needs.

State Law

The law authorizing a hazardous waste management program can be found in the Kansas Statutes Annotated, Article 34—Solid Waste and Hazardous Waste, as amended, effective July 1, 1981.

Kentucky

Relationship to Federal Regulations

On April 1, 1981, Kentucky received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, recyclers, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in Kentucky are now subject to the Kentucky hazardous waste management regulations in lieu of the Phase I Federal regulations adopted by EPA.

Kentucky's regulations have been judged to be "essentially equivalent" to the Phase I Federal regulations; nevertheless, there are several instances in which the Kentucky regulations are to some degree "more stringent" than the Federal rules.

State Law

Chapter 224 of the Kentucky Revised Statutes (KRS) authorizes the development of a hazardous waste management program in Kentucky. The law was amended in 1980 in order to provide the Department with the authority necessary to implement its hazardous waste management program in line with EPA requirements. These amendments took effect on July 15, 1980.

Louisiana

Relationship to Federal Regulations

On December 19, 1980, the state of Louisiana received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in Louisiana are now subject to the Louisiana hazardous waste management regulations in lieu of the Federal hazardous waste regulations adopted by EPA.

Louisiana has made liberal use of Section 3009 of RCRA, which allows a State to adopt "more stringent" requirements than those found in the Federal regulations.

State Law

The principal piece of legislation authorizing the establishment of a hazardous waste management program is Act 334, enacted by the State Legislature in 1978. Act 334 was expanded by Act 449 of 1979 and Act 194 of 1980.

Maine

Relationship to Federal Regulations

On March 18, 1981, Maine received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in Maine are now subject to the Maine hazardous waste management regulations in lieu of the Phase I regulations adopted by EPA.

The Maine regulations are "more stringent" than the Federal regulations in three areas.

State Law

The Maine Hazardous Waste, Septage and Solid Waste Management Act of 1979, as amended in 1980 and 1981, authorizes a hazardous waste management program in Maine. Chapter 13, Subchapters I, III and IV, deal with hazardous waste management.

Maryland

Relationship to Federal Regulations

On July 8, 1981, Maryland received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in Maryland are now subject to the Maryland hazardous waste management regulations in lieu of Phase I of the Federal regulations adopted by EPA.

Maryland adopted emergency regulations on December 12, 1980, and they became final rules on April 2, 1981. The State proposed amendments to the regulations on June 16, 1981, and they became effective on January 8, 1982.

The Maryland regulations are quite similar to those adopted by EPA, with some "more stringent" requirements.

State Law

The Safe Disposal of Hazardous Substances Act of 1976 authorizes the development of a hazardous waste management program in Maryland.

Massachusetts

Relationship to Federal Regulations

On February 25, 1981, Massachusetts received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in Massachusetts are now subject to the Massachusetts hazardous waste management management regulations in lieu of the Federal Phase I regulations adopted by EPA.

Massachusetts is in the process of developing comprehensive hazardous waste regulations, which will put the State in a position to seek Phase II interim authorization. Public hearings on the proposed regulations were held in December 1981; they should be adopted in 1982.

Massachusetts first adopted hazardous waste regulations in January 1973. In November 1980 the state revised the regulations to adopt by reference all the Federal regulations (40 CFR Parts 260-265), as well as retain desirable portions of the earlier regulations.

The result is that, although the Massachusetts regulations have been found to be "essentially equivalent" to the EPA Phase I regulations, they are somewhat different and in some instances "more stringent" than the Federal rules.

State Law

The Massachusetts Hazardous Waste Management Act of 1979 authorizes the establishment of a statewide program to provide for the safe management of hazardous wastes.

Michigan

Relationship to Federal Regulations

The Michigan Department of Natural Resources (DNR) is pursuing Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program in lieu of the Federal program. DNR anticipates receiving Phase I interim authorization in early 1982.

Until Michigan receives Phase I interim authorization, generators, transporters and owners/operators of treatment, storage and disposal (TSD) facilities will be subject to two sets of equal, but possibly conflicting, regulations: those adopted by EPA, and those adopted by Michigan DNR.

This dual regulation is a potential problem in Michigan, because the Michigan regulations contain 34 requirements that are "more stringent" than the EPA regulations.

State Law

Act 64, approved by the Governor on July 25, 1979, authorizes the development of a hazardous waste management program in Michigan. The Act is known as the Hazardous Waste Management Act, but is also known simply as Act 64.

Minnesota

Relationship to Federal Regulations

Minnesota is currently revising its hazardous waste management regulations in order to gain Phase I interim authorization from the U.S. Environmental Protection Agency (EPA).

It is hoped that the revised regulations will be adopted early in 1982, with Phase I interim authorization received around mid-1982.

Until Minnesota receives Phase I interim authorization, generators, transporters, and owners/operators of treatment, storage and disposal (TSD) facilities in Minnesota will be subject to two sets of different—but equal in effect—hazardous waste management regulations: Minnesota's and EPA's.

The Minnesota regulations were effective on June 18, 1979, and are quite different from the EPA regulations, which went into effect on November 19, 1980. In an effort to reduce the burden on the regulated community, on March 30, 1981, Minnesota revised its regulations to adopt certain EPA regulations, such as those on the manifest, label, exception reporting, etc.

However, Minnesota's regulations are still different from EPA's in seven areas.

State Law

Chapters 115 and 116 of the Minnesota Statutes authorize the development of a hazardous waste management program in Minnesota.

Mississippi

Relationship to Federal Regulations

On January 7, 1981, Mississippi received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in Mississippi are now subject to the Mississippi hazardous waste management regulations in lieu of the Phase I Federal hazardous waste regulations adopted by EPA.

On July 9, 1981, Mississippi adopted by reference all the Federal regulations found in 40 *CFR* Parts 260-267, and 122 and 124. Thus, Mississippi's regulations are identical to those adopted by EPA.

The only "more stringent" requirement that Mississippi has adopted is a "buffer zone" siting requirement for commercial hazardous waste landfills.

State Law

Mississippi Solid Wastes Disposal Law of 1974, as amended.

Missouri

Relationship to Federal Regulations

Missouri is currently operating under a Cooperative Arrangement to administer the Federal hazardous waste management program in Missouri, while at the same time laying the groundwork to seek both Phase I and Phase II, Components A and B interim authorization from the U.S. Environmental Protection Agency (EPA).

Until Missouri receives interim authorization, generators, transporters and owners/operators of treatment, storage and disposal (TSD) facilities will be subject to two sets of regulations, both equal in effect: those adopted by EPA and those adopted by Missouri.

That could pose a problem for the regulated community because Missouri has many requirements that are "more stringent" than those found in the EPA regulations.

State Law

The Hazardous Waste Management Law of 1977, as amended in 1980, authorizes the development of a hazardous waste management program in Missouri.

Montana

Relationship to Federal Regulations

On February 26, 1981, Montana received "limited" Phase I interim authorization from the U.S. Environmental Protection Agency (EPA), and "complete" Phase I interim authorization on February 17, 1981.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in Montana are now subject to the Montana hazardous waste management regulations in lieu of Phase I of the Federal program.

The Montana regulations are identical to those adopted by the Federal government.

State Law

The Montana Hazardous Waste Act of 1981 (Senate Bill 212) authorizes the establishment of a hazardous waste management program in the State.

Section 12(8) of the Act stipulates that the Department "may not adopt rules that are more restrictive than those promulgated by the Federal government under the Resource Conservation and Recovery Act of 1976, as amended."

Nebraska

Relationship to Federal Regulations

On January 12, 1982, Nebraska applied to the U.S. Environmental Protection Agency (EPA) for Phase I interim authorization to operate its own hazardous waste management program in lieu of the Federal program.

Until Nebraska receives Phase I interim authorization, generators, transporters, and owners/operators of treatment, storage and disposal (TSD) facilities will be subject to two sets of hazardous waste management regulations—those adopted by EPA and those adopted by Nebraska.

However, that shouldn't be much of a problem for the regulated community because Nebraska's regulations are equivalent in content, if not in form, to the EPA regulations. In general, Nebraska does not have any provisions that are "more stringent" than the Federal rules.

State Law

The 1980 and 1981 amendments to the Nebraska Environmental Protection Act authorize the Department of Environmental Control to operate a hazardous waste management program.

Nevada

Relationship to Federal Regulations

Nevada is currently operating under a Cooperative Arrangement with the U.S. Environmental Protection Agency (EPA) to administer the Federal hazardous waste management program in Nevada.

The Department of Conservation and Natural Resources is currently writing regulations that will qualify for Phase I and Phase II, Components A and B interim authorization.

It is hoped these regulations will be adopted in mid- or late-1982, at which time Nevada will make application for interim authorization.

At this time, Nevada's hazardous waste management regulations contain some portions of the EPA regulations, such as identification and listing, manifest requirements, reporting and recordkeeping requirements, etc. Therefore, anyone familiar with the Federal regulations will have no problem complying with the Nevada regulations.

State Law

Assembly Bill 196, which amended Chapter 444 of Nevada Revised Statutes (NRS) by adding Sections 2 to 35, authorizes the development of hazardous waste management program in Nevada.

New Hampshire

Relationship to Federal Regulations

On November 3, 1981, New Hampshire received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in New Hampshire are now subject to the New Hampshire hazardous waste management regulations in lieu of Phase I of the Federal program.

New Hampshire has adopted regulations that are "substantially equivalent" to the Federal regulations, but has taken advantage of the opportunity to adopt "more stringent" requirements.

State Law

Chapter 347, establishing a hazardous waste management program, was enacted July 1, 1979. The law (RSA 47A) was amended in 1981.

New Jersey

Relationship to Federal Regulations

In November 1981, New Jersey applied to the U.S. Environmental Protection Agency (EPA) for Phase I interim authorization to operate its own hazardous waste management program in lieu of the Federal program. Approval was expected in 1982.

Until New Jersey received Phase I interim authorization, generators, transporters, and owners/operators of treatment, storage and disposal (TSD) facilities will be subject to two sets of hazardous waste regulations—those adopted by EPA and those adopted by New Jersey.

New Jersey's regulations contain several provisions that are "more stringent" than those found in the Federal regulations.

State Law

The New Jersey Solid Waste Management Act of 1975, as amended, authorizes the development of a hazardous waste management program in that State.

New Mexico

Relationship to Federal Regulations

New Mexico is operating under a Cooperative Arrangement with the U.S. Environmental Protection Agency (EPA) to administer the Federal hazardous waste management program in that State.

The Environmental Improvement Division (EID) is updating its regulations, hopes to have the process complete by the end of 1982, and at that time will apply to EPA for interim authorization to operate its own program in lieu of the Federal program.

Until that time, generators, transporters, and owners/operators of TSD facilities will be subject to two sets of different—but equal— hazardous waste management regulations: those adopted by EPA and those adopted by EID.

That shouldn't be much of a problem, however, because New Mexico's regulations are not in great conflict with EPA's. The only potential problem is that New Mexico allows disposal on site without a permit, while EPA requires a permit for on-site disposal. However, in practice all New Mexico on-site disposal facilities have obtained interim status under the EPA regulations.

The new regulations, when adopted, will closely parallel the EPA regulations, and there shouldn't be any "more stringent" requirements.

State Law

The Hazardous Waste Act of 1977, as amended in 1981, authorizes the development of a hazardous waste management program in New Mexico.

New York

Relationship to Federal Regulations

On January 12, 1982, New York applied for Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program in lieu of Phase I of the Federal program.

Until New York receives Phase I interim authorization, which is expected in late spring or early summer 1982, generators, transporters, and owners/operators of treatment, storage and disposal (TSD) facilities will be subject to two sets of regulations, both equal in effect: the New York regulations and the EPA regulations.

While New York's regulations "incorporate" the EPA regulations, New York's regulations are "more stringent" than the Federal requirements in 10 significant areas.

State Law

The Industrial Hazardous Waste Management Act of 1978 and the 1979 amendments to the Environmental Conservation Law form the basis for legislative authority to operate a hazardous waste management program in New York.

North Carolina

Relationship to Federal Regulations

North Carolina received Phase I interim authorization on December 18, 1980, and Phase II, Components A and B, interim authorization on March 26, 1982, from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners/operators of treatment, storage and disposal (TSD) facilities in North Carolina are now subject to the North Carolina hazardous waste management regulations in lieu of the Phase I and Phase II, Component A and B Federal regulations adopted by EPA.

North Carolina has adopted all of the EPA regulations and amendments through May 1981; thus, no North Carolina regulations are "more stringent" than the Federal regulations.

However, the 1981 amendments to the North Carolina Solid Waste Management Act allows North Carolina to be more stringent in siting of TSD facilities. Regulations carrying out the intent of the amendments have not yet been adopted.

State Law

The Solid Waste Management Act of 1979 authorizes the development of a hazardous waste management program in North Carolina. The law prohibits any of the North Carolina regulations from being "more stringent" than the Federal regulations.

However, 1981 amendments to the Act authorize "more stringent" regulations in location of the TSD facilities.

North Dakota

Relationship to Federal Regulations

North Dakota received "limited" Phase I interim authorization from the Environmental Protection Agency (EPA) on December 12, 1980.

This means that North Dakota requirements for disposal facilities supersede EPA requirements; all Federal requirements applicable to generators, transporters, and storage and treatment facilities continue to apply in North Dakota.

As soon as hazardous waste regulations are in place, North Dakota intends to seek full authorization status.

State Law

The North Dakota Hazardous Waste Management Act (North Dakota Century Code 23-20-3), effective July 1, 1981, authorizes the State Department of Health to develop and administer a hazardous waste management program in the state.

Ohio

Relationship to Federal Regulations

On January 12, 1982, Ohio submitted an application for Phase I interim authorization to the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program in lieu of the Federal program.

Until Ohio receives Phase I interim authorization, generators, transporters, and owners/operators of treatment, storage and disposal (TSD) facilities will be subject to two sets of regulations: those adopted by EPA and those adopted by Ohio.

This shouldn't be much of a problem, however, because Ohio's regulations are nearly identical to the Federal regulations. The lone "more stringent" requirement of Ohio's regulations is that transporters must register and obtain a registration number.

Ohio is currently in the process of seeking changes in its hazardous waste law, which will enable the State to seek Phase II interim authorization from EPA.

State Law

Senate Bill 269 (Chapter 3734), signed on October 9, 1980, authorizes Ohio EPA to develop a hazardous waste management program. Essentially, the law directs Ohio EPA to adopt regulations which are "consistent with and substantially equivalent to" the regulations adopted by EPA. These statutory requirements effectively lock the State into adopting regulations identical to the Federal rules. However, the law allows the director of Ohio EPA to adopt regulations in areas of hazardous waste management in which EPA has chosen not to develop regulations.

Oklahoma

Relationship to Federal Regulations

On January 14, 1981, Oklahoma received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in Oklahoma are now subject to the Oklahoma hazardous waste management regulations in lieu of the Federal hazardous waste regulations adopted by EPA.

Oklahoma has revised it regulations and has applied for Phase II, Components A and B interim authorization. The amendments went into effect on February 9, 1982.

Oklahoma has taken advantage of the opportunity to adopt "more stringent" requirements than those found in the EPA regulations.

State Law

The Oklahoma Controlled Industrial Waste Disposal Act of 1976, as amended in 1978, 1979, 1980 and 1981, authorizes a hazardous waste management program in Oklahoma.

It should be noted that the Act uses the term "controlled industrial waste" as a definitive phrase rather than the term "hazardous waste" used in the Federal program. For all intents and purposes, the terms have the same meaning.

Oregon

Relationship to Federal Regulations

On July 16, 1981, Oregon received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in Oregon are now subject to the Oregon hazardous waste management regulations in lieu of the Phase I Federal hazardous waste regulations adopted by EPA.

Although Oregon's regulations are significantly different than the Federal regulations found in 40 CFR Parts 260-265, EPA has determined that they are "substantially equivalent" to the Federal regulations. However, in order to receive final authorization, Oregon's regulations must be "equivalent" to the Federal regulations, and the State must make substantial changes in its regulations.

State Law

The State Waste Control Act of 1969, as amended as recently as mid-1981, authorizes the development of a hazardous waste management program in Oregon. The law can be found in the Oregon statutes, Chapter 459.

Transporters are regulated under the authority of Oregon statutes, Chapters 484, 756 and 767.

Pennsylvania

Relationship to Federal Regulations

On May 26, 1981, Pennsylvania received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners and operators of treatment, storage, and disposal (TSD) facilities in Pennsylvania are now subject to the Pennsylvania hazardous waste management regulations in lieu of the Federal hazardous waste regulations adopted by EPA.

Pennsylvania has taken advantage of the opportunity to adopt requirements that are "more stringent" than those found in the Federal regulations.

State Law

The Pennsylvania Solid Waste Management Act of 1980 authorized the development of a hazardous waste management program in that State. All rules and regulations are promulgated under the authority of Article IV, Section 401 of the Act.

Rhode Island

Relationship to Federal Regulations

On May 29, 1981, Rhode Island received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in Rhode Island are now subject to the Rhode Island hazardous waste management regulations in lieu of the Federal Phase I regulations adopted by EPA.

While Rhode Island's regulations have been judged to be "substantially equivalent" to the Federal regulations, Rhode Island has taken advantage of the opportunity to adopt many "more stringent" requirements.

State Law

The Hazardous Waste Management Act of 1978 authorizes the development of a hazardous waste management program in Rhode Island.

South Carolina

Relationship to Federal Regulations

On February 24, 1981, South Carolina received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in South Carolina are now subject to the South Carolina hazardous waste management regulations in lieu of Phase I of the Federal program.

While South Carolina's regulations have been judged to be "substantially equivalent" to the Federal regulations, South Carolina has taken advantage of the opportunity to adopt many "more stringent" requirements.

State Law

The Hazardous Waste Management Act of 1978 authorizes the development of a hazardous waste management program in South Carolina. The Act was last amended in 1981.

South Dakota

Relationship to Federal Regulations

Currently, South Dakota is operating under a Cooperative Arrangement with the Environmental Protection Agency (EPA) to administer the Federal hazardous waste management program in South Dakota.

However, in the near future South Dakota expects to receive Phase I interim authorization from EPA to operate its own hazardous waste management program in the State.

This will have little, if any, practical effect since South Dakota has adopted the Federal regulations and plans to do so in the future.

South Dakota expects to revise its regulations in the near future to adopt amendments to the Federal regulations which have been promulgated since May 19, 1980. This will put the State in a position to apply for Phase II, Components A and B interim authorization.

State Law

Solid Waste Disposal (Chapter 34A-6) authorizes a hazardous waste management program in South Dakota.

Tennessee

Relationship to Federal Regulations

On July 16, 1981, Tennessee received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners/operators of treatment, storage and disposal (TSD) facilities in Tennessee are now subject to the Tennessee hazardous waste management regulations in lieu of the Phase I Federal regulations adopted by EPA.

While Tennessee's regulations have been judged to be "substantially equivalent" to Phase I of the Federal regulations, Tennessee has adopted several "more stringent" requirements.

State Law

The Tennessee Hazardous Waste Management Act of 1975, as amended most recently in 1981, authorizes the development of a hazardous waste management program in Tennessee.

Texas

Relationship to Federal Regulations

On December 14, 1980, Texas received Phase I interim authorization and on March 12, 1982, Phase II, Components A and B interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners/operators of treatment, storage and disposal (TSD) facilities in Texas are now subject to the Texas hazardous waste management regulations in lieu of the Phase I and Phase II, Components A and B of the Federal regulations.

The Texas regulations are "substantially equivalent" to the Federal regulations; however, Texas has adopted three "more stringent" requirements.

State Law

The State of Texas Solid Waste Disposal Act (Article 4477-7 of the Revised Civil Statutes), last amended in 1981, authorizes the development of a hazardous waste management program in Texas.

Utah

Relationship to Federal Regulations

On December 12, 1980, Utah received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in Utah are now subject to the Utah hazardous waste management regulations in lieu of the Phase I Federal regulations adopted by EPA.

Utah's regulations are "essentially equivalent" to the Federal regulations, and Utah does not have any "more stringent" provisions. Thus, one familiar with the EPA regulations should have no problems with the Utah regulations.

State Law

The Utah Hazardous Wastes Act of 1979 authorizes the development of a hazardous waste management program in Utah.

Vermont

Relationship to Federal Regulations

On January 8, 1981, Vermont received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in Vermont are now subject to the Vermont hazardous waste management regulations in lieu of the Phase I Federal regulations adopted by EPA.

While Vermont's regulations have been judged "substantially equivalent" to Phase I of the Federal regulations, Vermont's regulations are in a different format and in some instance contain some significant "more stringent" requirements.

State Law

Chapter 159 (Solid Waste Management) of Title 10 of the Vermont Statutes Annotated, as amended in 1981, authorizes the development of a hazardous waste management program in Vermont.

Virginia

Relationship to Federal Regulations

On November 3, 1981, Virginia received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners and operators of treatment, storage, and disposal (TSD) facilities in Virginia are now subject to the Virginia hazardous waste management regulations in lieu of Phase I of the Federal regulations.

The Virginia regulations are "substantially equivalent" to Phase I of the Federal regulations. Virginia has two provisions that are "more stringent" than the Federal regulations.

State Law

Chapter 6, Title 32.1, Article 3, Solid Waste Management, Code of Virginia, authorizes the development of a hazardous waste management program in Virginia.

Washington

Relationship to Federal Regulations

The State of Washington was expected to apply to the U.S. Environmental Protection Agency (EPA) in March 1982, for Phase I and Phase II, Components A and B interim authorization to operate its own hazardous waste management program in lieu of the Federal program.

Until Washington receives interim authorization, generators, transporters, and owners/operators of treatment, storage and disposal (TSD) facilities will be subject to two sets of regulations, both equal in effect. They are the EPA regulations and those adopted by the State of Washington.

State of Washington officials advise individuals to follow the State regulations, because they are equivalent to—and in some instances exceed—the Federal regulations. The State of Washington has adopted several "more stringent" requirements than those found in EPA regulations.

State Law

The Hazardous Waste Disposal Act of 1976 (Chapter 70.105RCW) authorizes the development of a hazardous waste management program in the State of Washington.

West Virginia

Relationship to Federal Regulations

West Virginia is operating under a Cooperative Arrangement with the U.S. Environmental Protection Agency (EPA) to administer the Federal hazardous waste management program in West Virginia.

West Virginia has proposed hazardous waste management regulations, and should have them in place in spring, 1982.

West Virginia hopes to seek Phase I and Phase II final authorization from EPA in August 1982.

State Law

The Hazardous Waste Management Act of 1981 authorizes the development of a hazardous waste management program in West Virginia.

Wisconsin

Relationship to Federal Regulations

On January 15, 1982, Wisconsin received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in Wisconsin are now subject to the Wisconsin hazardous waste management regulations in lieu of Phase I of the Federal program.

Although Wisconsin's regulations are "substantially equivalent" to the Federal regulations, the Wisconsin Department of Natural Resources has taken advantage of the opportunity to adopt requirements that are "more stringent" than the Federal requirements.

State Law

The Hazardous Waste Management Act, found in Sections 144.60 to 144.74 of the Wisconsin Statutes, authorizes a hazardous waste management program in Wisconsin.

Wyoming

Relationship to Federal Regulations

The Environmental Protection Agency (EPA) is operating the Federal hazardous waste management program in Wyoming.

Wyoming withdrew its Cooperative Arrangement in June 1981, to operate the Federal hazardous waste management program in that State when it became apparent that the Wyoming legislature would not adopt the necessary legislation.

Until necessary legislation is enacted, Wyoming will not be in a position to seek interim authorization from EPA.

State Law

The Wyoming Environmental Quality Act, Article 5, authorizes the Director of Environmental Quality to:

- Coordinate the activities of all state agencies concerned with solid waste management and disposal;
- Promulgate rules and regulations for operation of solid waste disposal sites;
- Request solid waste disposal site plans for approval from any person or municipality that proposes to establish or is presently operating a solid waste disposal site.

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International Fire Protection

International Fire Experience

As documented by the National Fire Protection Association and other sources, the fire problem in the United States is quite complex and is influenced by many aspects of the physical environment in which Americans live and the American lifestyle. So it is very interesting to ask how variations in such influences among countries might be reflected in their fire experience. It is possible that this kind of inquiry could identify fire protection lessons that are transferable among nations and thus of great benefit in reducing fire losses. For this reason, a number of studies have been made that try to establish benchmark international comparisons of fire experience upon which further research could be based. Such work has been done by Wilmot[1] in Europe and by The Georgia Institute of Technology[2] and the NFPA[3] in the United States.

The results of these efforts to compare fire experience among nations must thus far be regarded as preliminary and tentative. This caution is necessary because of wide disparities among nations in methods for collecting and analyzing fire experience data. Despite these difficulties, a number of findings have emerged that raise questions worthy of comment and further study. The results of The Georgia Institute of Technology research are the most recent available and will be used to discuss selected international comparisons.

Comparisons of Selected Fire Experience Statistics

1. Fire Loss in Relation to Gross National Product

Figure 1 displays loss in building fires as a percent of gross national product for selected countries. Gross national product is a measure of the total value of goods and services produced by a country and is thus an indicator of the overall level of economic activity. For the 1979-1980 period, the United States was eighth highest among the eleven nations reporting this statistic.

2. Fire Loss in Relation to National Population

Figure 2 displays monetary loss per person in building fires for selected countries. For the 1979-1980 period, the United States was seventh highest among the eleven nations reporting this statistic.

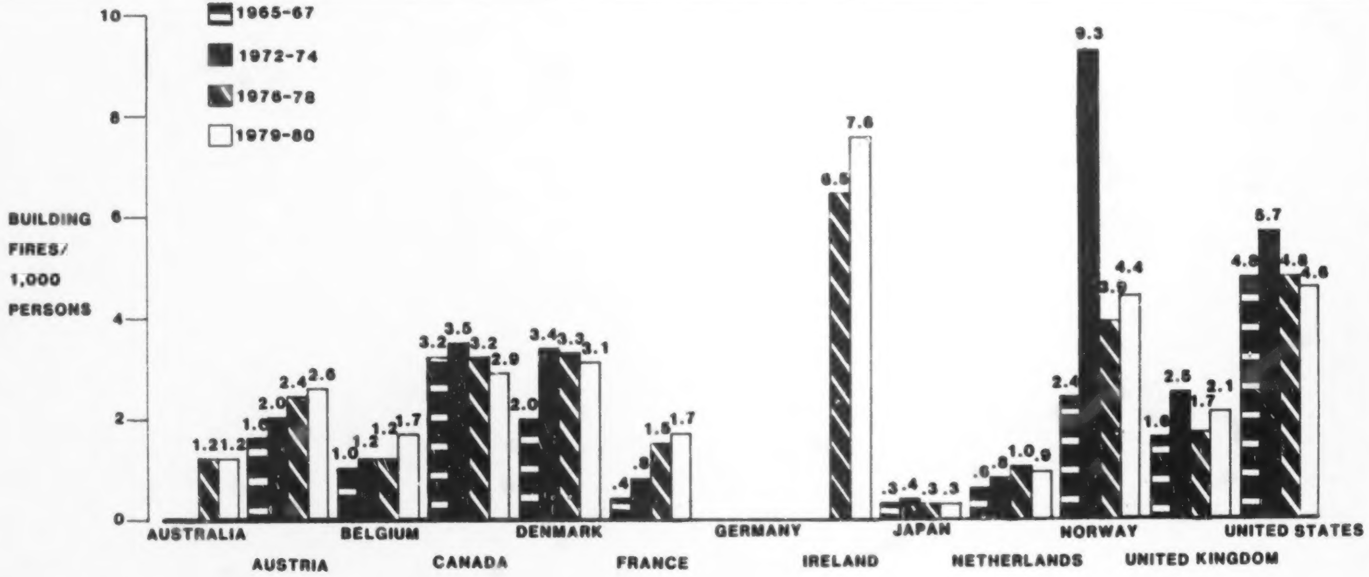
3. Fire Loss in Relation to Number of Fires

Figure 3 displays monetary loss in building fires divided by the number of building fires reported for selected countries. For the 1979-1980 period, the United States was ninth highest among the ten nations reporting this statistic.

4. Number of Building Fires in Relation to National Population

Figure 4 displays the number of building fires per thousand persons reported for selected countries. For the 1979-1980 period, the United States was second highest among the twelve nations reporting this statistic.

COMPARISON OF FIRE LOSS INDICES
FIGURE 1



Notes: Values for current time period are taken from Table 2-1 of the document. Values for earlier time periods, other than death data, are taken from earlier Gerogia Tech reports [2, 28].

Death values are from *WHO Statistics Annual: Vital Statistics and Causes of Death* [29] and reflect an average for the time period indicated.

COMPARISON OF FIRE LOSS INDICES

FIGURE 2

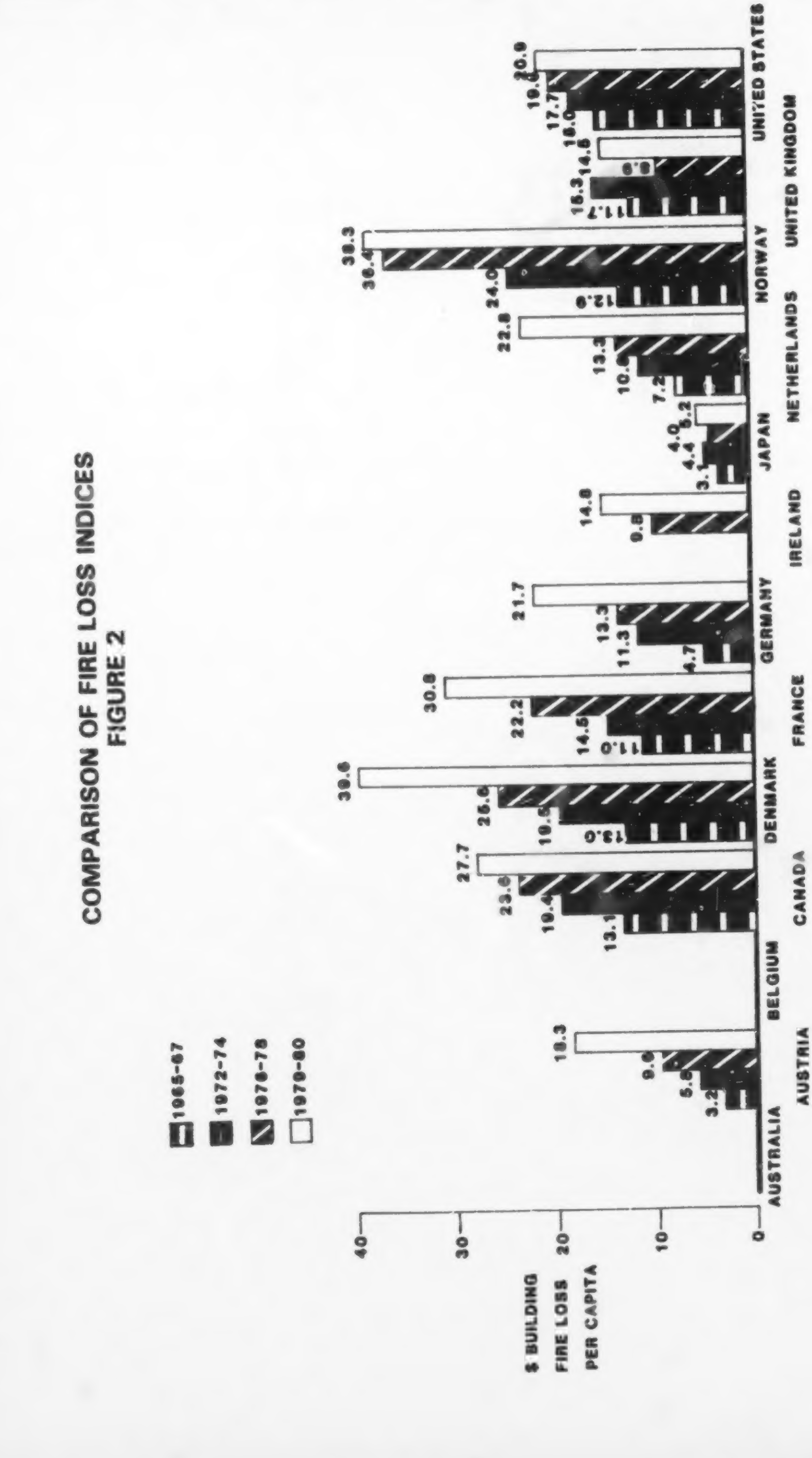
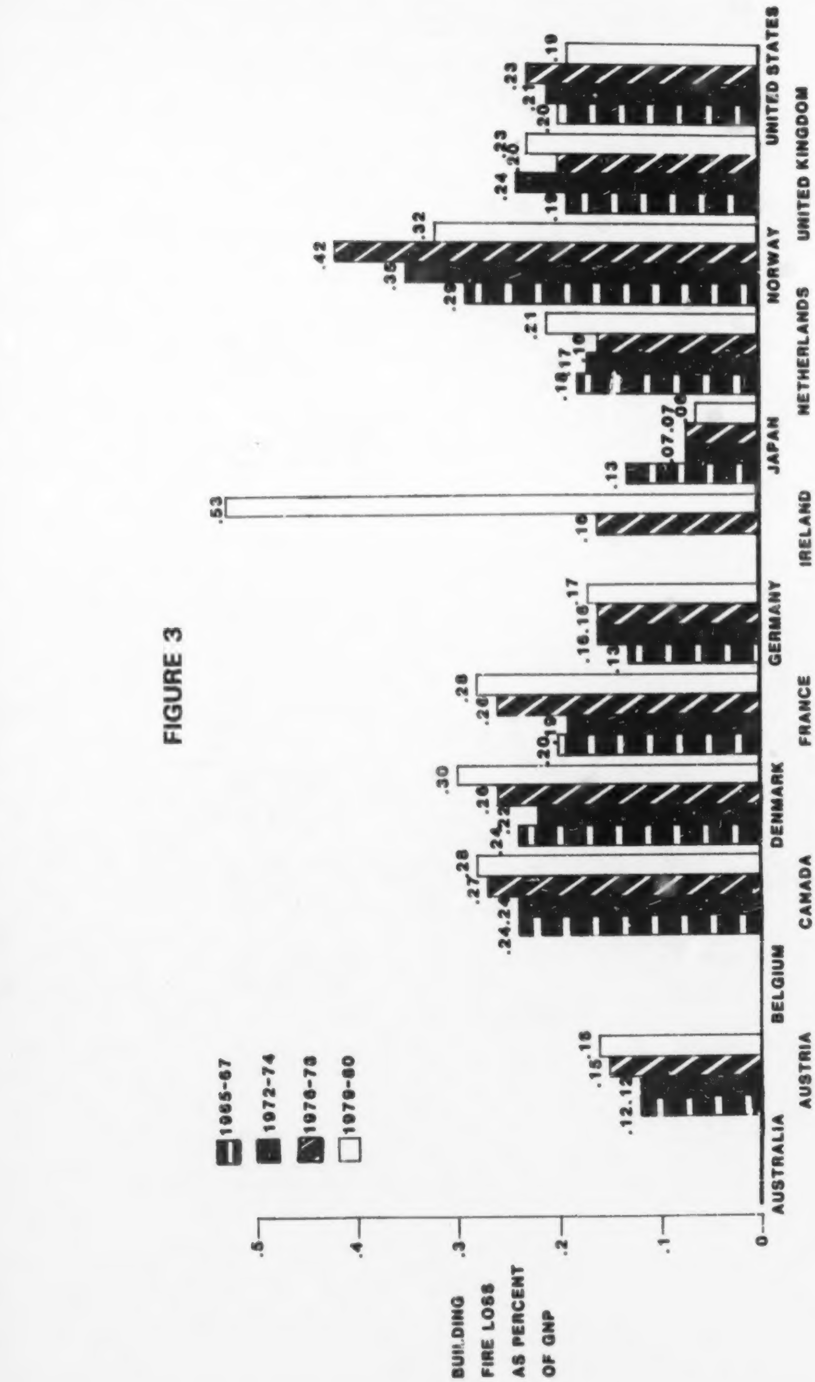


FIGURE 3


BUILDING
FIRE LOSS
AS PERCENT
OF GNP
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1972-74
1976-78
1979-80
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BELGIUM
CANADA
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DENMARK
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FRANCE
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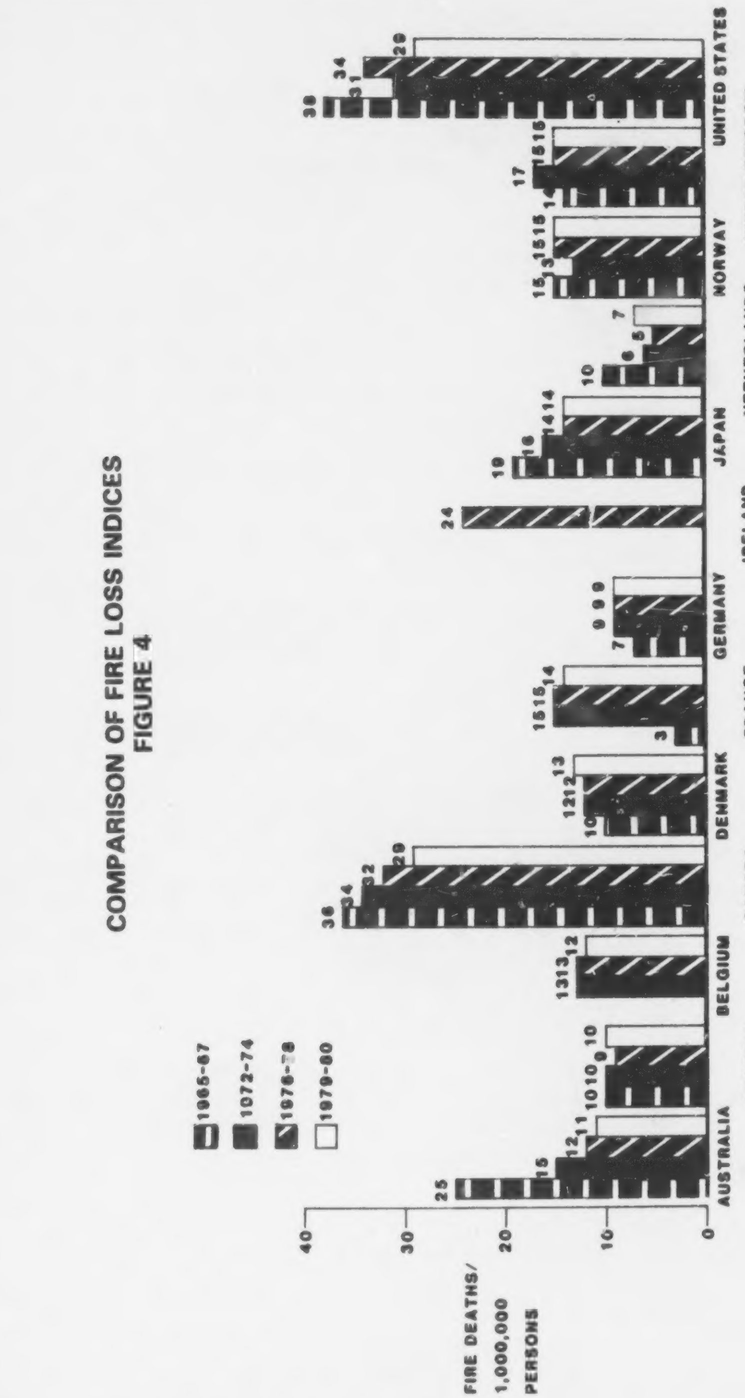


COMPARISON OF FIRE LOSS INDICES
FIGURE 4

5. Fire Deaths in Relation to National Population

Figure 5 displays the number of fire deaths per million persons reported for selected countries. Death data are from the World Health Organization (WHO) and exclude two categories of fire deaths in order to avoid double counting in the WHO statistical system. These categories are deaths in vehicle fires (classified as transportation deaths) and deaths known to have occurred in arson fires (classified as homicides). For the most recent year reported, the United States is tied with Canada for first place among the thirteen nations reporting this statistic.

6. Fire Deaths in Relation to Number of Fires

Figure 6 displays the number of fire deaths per thousand building fires reported for selected countries. For the most recent year reported, the United States is eighth highest among the twelve nations reporting this statistic.

Important Similarities in the Fire Problem

Figures 1 through 6 display many striking contrasts in the fire problem as reported by various nations. However, in the face of such differences, a number of key facts about the fire problem stand out in common among many nations. These include:

1. Deaths are heavily concentrated in residential fires. For six countries reporting the statistic, the ratio of residential to nonresidential fire deaths ranged from 8.0 to 12.0.
2. For all nations reporting, men are at greater risk than women of becoming victims of fire.
3. For all nations reporting, the very young and the very old make up a disproportionate number of fire victims.
4. Throughout the world, concern about the problem of arson is growing. For example, in the state of New South Wales in Australia a new Standing Committee on Arson has recently been formed with the objective of coordinating the fight against the rapidly increasing crime of arson there. In England a government study estimated that in 1977 arson was responsible for one third of all fire losses.

Possible Reasons for Differences in National Fire Experience

The underlying reasons for contrasts in national fire experience are not well understood. Differences are often very puzzling; this is particularly the case when compared nations seem to have comparable fire hazards but report appreciably differing fire statistics. For example, there is little uniformity worldwide in procedures for collecting fire experience data and in corresponding statistical methods for analyzing these data. Researchers in this field are well aware that instances of seemingly different fire experience may result merely from such differences in collection and analysis methods. Another difference is the substantial variations in cultural attitudes to fire and to the conservation of available resources. For example, in Japan fire has always been considered a very great danger, and the Japanese have a correspondingly high awareness of firesafety. Other possible reasons for differences in national fire experience may be:

- Effectiveness of fire prevention and fire protection programs.
- Effectiveness of firesafety codes and standards.
- The relation among the level of application of fire protection technology, fire service resources, and the level of hazards created by new development.
- Building construction.
- Levels of economic and technological development.
- Climate.

COMPARISON OF FIRE LOSS INDICES
FIGURE 5

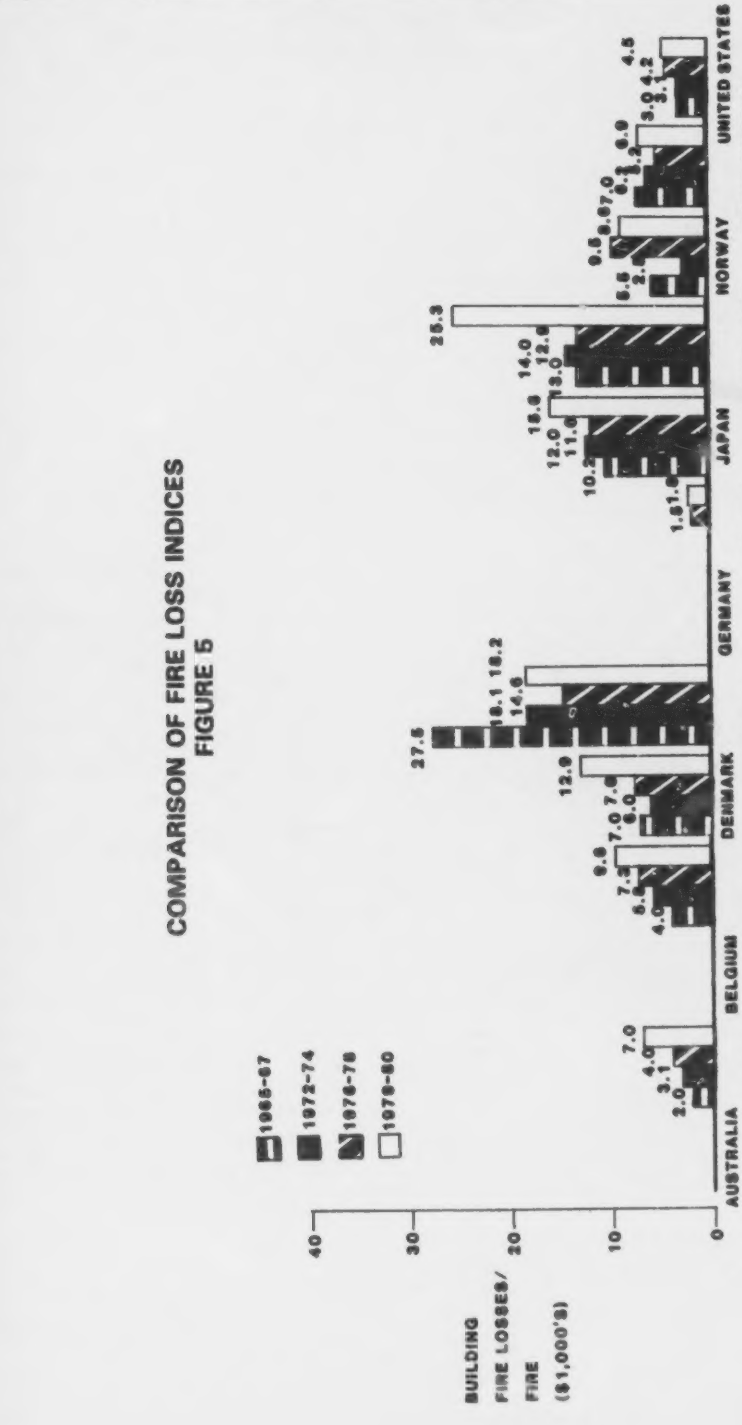
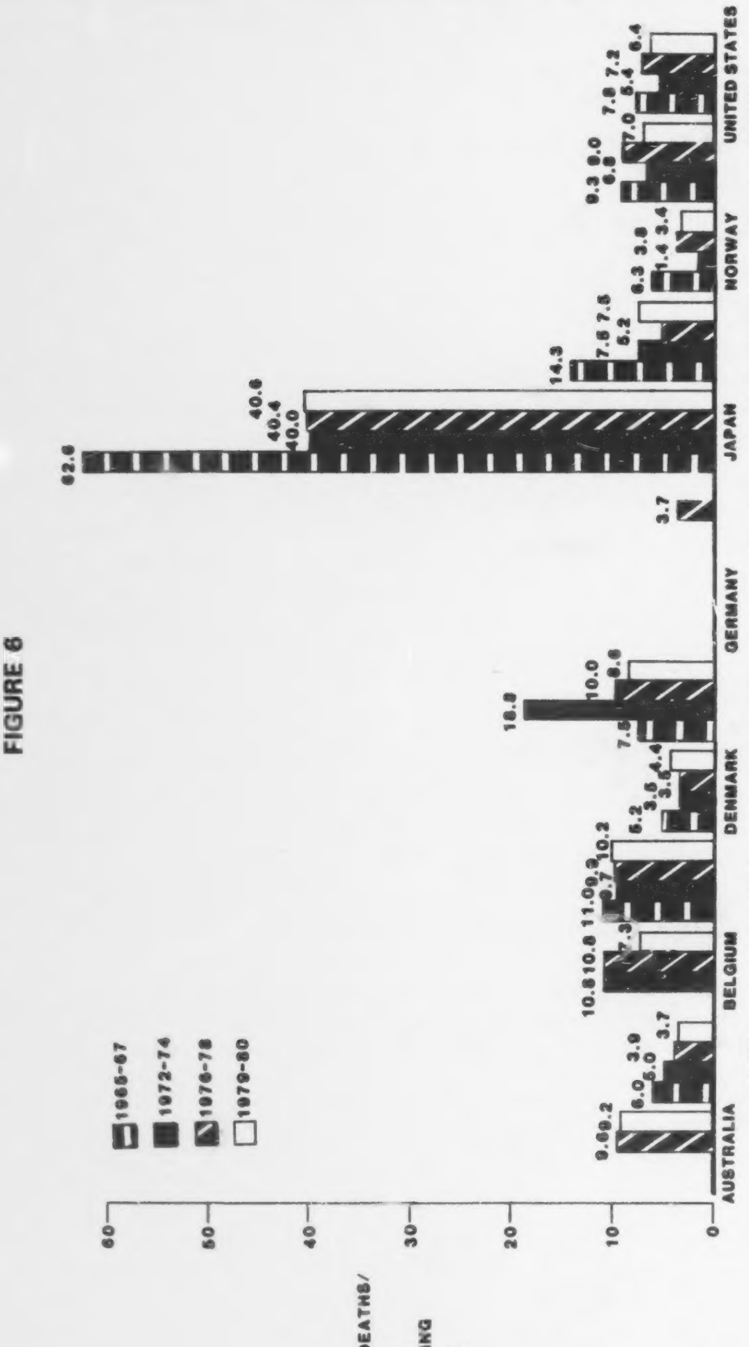


FIGURE 6


FIRE DEATHS/
1,000
BUILDING
FIRES
60
50
40
30
20
10
0
▥ 1965-67
■ 1972-74
▨ 1976-78
☐ 1979-80
AUSTRALIA
9.6 9.2
AUSTRIA
6.0 5.0 3.9 3.7
BELGIUM
10.8 10.8 7.3
CANADA
11.0 0.9 9.7 10.2
DENMARK
5.2 3.5 3.6 4.4
FRANCE
7.5 18.8 10.0 8.6
GERMANY
IRELAND
3.7
JAPAN
62.6 40.0 40.4 40.6
NETHERLANDS
14.3 7.5 5.2 7.5
NORWAY
6.3 1.4 3.8 3.4
UNITED KINGDOM
9.3 6.8 9.0 7.0
UNITED STATES
7.8 5.4 7.2 6.4

- Extent of insurance coverage and business practices of insurers.
- Demographic characteristics of residential populations.
- Occupancy patterns and building usage.

Efforts to Improve International Fire Statistics

As noted at the beginning of this chapter, research on international fire experience has been active during the last several years in Europe and the United States. Announcement has recently been made of the formation of the World Fire Statistics Centre in Geneva with the aim of encouraging better world fire cost statistics. The Centre is affiliated with the Association Internationale pour l'Etude de l'Economie de l'Assurance (Geneva Association) and has cooperated with the United Nations Economic Commission for Europe in a pilot project to improve statistics for four European nations (United Kingdom, Denmark, France, and Hungary). In addition, the Centre is organizing, through the Geneva Association, an international seminar on fire statistics to be held in Geneva in March 1983. For more information about the Centre, please contact:

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References

[1]Tom Wilmot, "European Fire Costs: The Wasteful Statistical Gap," *The Geneva Papers on Risk and Insurance*, No. 13, (October 1979).

[2]Jerry Banks, *Selected International Comparisons of Fire Loss, 1979-1980*, Georgia Institute of Technology, September 1982 (supported by the Federal Emergency Management Agency).

[3]*Fire Protection Handbook*, 15th edition, NFPA, 1981, pp. 2-15 to 2-16 and 2-33 to 2-34.

The Global Fire Problem — 1982

The summaries in this article are taken from remarks made by delegates from the fire protection associations of each of the countries represented in this survey at the International Fire Protection Organizations Conference held September 15-18, 1982 at the National Fire Protection Association's headquarters in Quincy, MA. The conference brought together delegates from five continents for papers and discussions on the world's major fire problems. As the summaries illustrate, the residential fire problem in Europe is almost negligible, while in the U.S. it is the major source of fatal fires and the nation's worst fire problem.

Belgium

Belgium's low fire death rate of 100 fire deaths per year in a population of about 1,000,000 people is not an incentive for much legislation in favor of residential fire protection. In 1967, a fire that took over 350 lives in a Belgian department store led to regulations governing fire protection in industrial and commercial occupancies. However, there are few laws governing fire protection in places of assembly.

The National Council for Fire Prevention aims to see that legislation is enacted to regulate fire protection in places of assembly and existing hotels. The Council also aims to develop a standard for the approval of fire protection and building materials; public information about firesafety, since none is distributed; and a study of the arson problem in Belgium.

(Summarized from remarks made by H. Aresu de Seui, Director of A.N.P.I., Brussels, Belgium.)

Colombia

Colombia's recent entry into the group of semi-industrial nations has brought with it many new problems and intensified old ones, among them fire. Until recently, a way to come to grips with the fire problem was not available. Statistics about fire are poor since there is no uniform reporting procedure for fires. There are only about 140 fire departments in a country with nearly 1,000 communities and 85 percent of these are volunteer. There is no official law, code, or standard for firesafety and no building code. Thus, there are no mechanisms for approving building plans nor for on-site inspections during and after construction. Until 1981, there were no courses taught about fire protection in engineering and architectural schools.

It is known that in 1980 over 500 people were killed by fire in Colombia, or 20 deaths per one hundred million. Two hundred of these deaths were children under 14 years old. During that same year, more than 8,000 people were hospitalized and over 24,000 received some kind of medical attention for burns caused by fire, explosion, and chemicals.

According to fire department reports, 60 percent of fires occur during the day and 40 percent at night. Also according to their reports, only 20 percent of the fire locations had some kind of fire prevention equipment (mainly fire extinguishers) and only 8 percent had fire insurance coverage. Statistics from four major cities indicate that 60 percent of their fires are in private residences, while the construction industry estimates residential fires comprise 80 percent of all fires. These cities cited electrical causes in 25 percent of the fire incidences and arson in 8 percent. In Colombia's principal city of Bogota, the fire department attended over 4,000 calls in 1981, of which 810 were fires. The department has 300 paid units serving a population of 4.5 million from seven stations. The chief commander is a police officer appointed for one year as a training assignment.

Colombia's combination of tropical climate and high altitudes creates special fire problems. At high elevations, such as in Bogota located over 8,500 feet above sea level, a cigarette that will burn out in 2.5 minutes at sea level will take 5 minutes to burn out. The combustible load is high in such high elevations where temperatures may dip to 32°F at night after daytime highs in the 80s. Construction materials are mainly brick and concrete, although wood with clay and earth plaster may be used in old construction. Since heating and air conditioning are almost nonexistent, neither of these present fire problems. In elevations less that 3,000 feet below sea level, the combustible load is low — interior furnishings are of noncombustible materials, and furniture is a metallic type with low amounts of combustible materials. Construction features open structures with large spaces and high ceilings.

Industrial growth has contributed to the fire problem. Cities are growing fast and, with the population increase, high-rise buildings for combined living and business use and large shopping centers are being built. In this new construction, more combustible materials are being used, for example, plastics for walls, floors, carpeting, furniture, equipment, pipes, and electric wiring. And more and more, large concentrations of combustible materials can be found in warehouses, shopping centers, and oil and gas storage centers. In the future, gas lines from the large depots of natural gas will be run under streets and buildings, thus increasing the fire problem in cities.

Colombia is beginning to deal with its fire problems. The national government recently passed a law stating that structures housing more than one family must have fire protection and adequate means of egress, with the provision that the law can be amended to include new technological developments. The National Institute of Standards (ICONTEC) is preparing fire protection standards that when approved will be enforced under the national law.

Standards for fire extinguishers, extinguishing agents, and standpipes have been approved, as well as a life safety code and general electrical code. Standards for sprinklers, fire detection and alarm systems, and the combustibility of materials are currently being developed. Before the codes and standards are enforced as law, they are tested on the one fire department in the country that has a preventative-oriented policy.

In the last couple of years, insurance companies have established Technical Prevention Departments. These departments are staffed with engineers who appraise risks and assist clients in correcting fire hazards. Some engineering and business administration schools have introduced fire protection as part of their general safety and occupational health curriculums.

These improvements in firesafety are supported and encouraged by the Consejo Colombian de Seguidad, a national safety council established in 1953. This nonprofit organization is involved in teaching and training people about firesafety and in promoting firesafety among the general public.

(Summarized from remarks made by Dr. Hector Angel, President, Consejo Colombian de Seguidad, Bogota, Colombia.)

Denmark

According to the Danish Fire Protection Association (DFPA), Denmark's worst fire problem is people, specifically their lack of concern about firesafety. To increase the public awareness about firesafety, the DFPA sponsors short film spots on television, radio programs on general fire risks, and articles and press releases in Danish newspapers and magazines.

In addition to an overall lack of concern, there is also a lack of fire statistics that can be used to help manage available resources to meet the fire problem. Currently, solutions are being developed to meet the problems of explosion relief in the handling of grains and fodder and in other dust-creating industries.

Furnaces fueled by straw are another fire problem in Denmark as they are being used widely for an economical source of heat. Information about the safe installation, arrangement, and operation of these straw-fired furnaces is being distributed. The problems caused in chimneys by the deposit left when these furnaces burn remain to be solved.

(Summarized from remarks made by Ernst Nielsen, Managing Director, Danish Fire Protection Association, Datavej, Denmark.)

France

A 1970 dance hall fire that killed 146 and a 1973 school fire that took the lives of 20 children resulted in some regulations for firesafety in France. However, fire is not a main cause of accidental death in France where about 250 deaths and 1,000 injuries occur annually from fire in a population of approximately 53,710,000 (1980). Fire claims 4 billion, 5 million francs (Mar. 1982: 6.24 francs=$1 US) in property losses annually in the industrial sector. Other structure fires result in property losses of 5 billion francs annually.

(Summarized from remarks made by Philippe de Moulins, Centre National de Prevention et de Protection, Paris, France.)

India

Since India achieved independence in 1950, the population shift from rural to urban areas has placed increased pressure on the public services in urban areas. Rapid industrialization and urbanization have increased the frequency and extent of fires and the losses from them. Direct losses from fire amount to about $1 million (US), while indirect losses amount to $9 million (US), less than 1 percent of the annual national income.

Fire, however, is recognized as a major concern. In 1978, the general insurance industry was nationalized and the Loss Prevention Association (LPA) was established to promote the philosophy and practice of loss prevention and the public's firesafety awareness. The LPA recognizes that motivation, awareness, and safety code enforcement are necessary to help prevent fires. In support of its fire prevention mission, the LPA collects data about fire in India; promotes the use of safety codes and firesafe practices; and provides a direct loss minimization service through its fire salvage corps. Since the fire service in India does not have the manpower to do salvage once the fire is out, the LPA organized a salvage corps in Bombay for this purpose and plans to organize corps in three other major cities in the future.

(Summarized from remarks made by S. P. Gupta, Managing Director, Loss Prevention Association of India Ltd., Bombay, India.)

Japan

Since World War II, fire protection in Japan has improved impressively. The fire service has changed from a chiefly volunteer organization to a professional one. The number of municipalities with full-time fire departments has grown from 218 in 1949 to 2,792 in 1980. The number of fire fighters grew to 117,000 during the same time period, or five times their number since 1949. The fire service is mainly involved in fire fighting, fire prevention, and first aid (emergency services).

Fire prevention has also significantly improved since the Fire Service Law of 1949 took effect. Fire prevention inspections, the regulation of hazardous materials, and the installation of fixed fire protection systems have improved and increased. The mandated installation of sprinklers in occupancies of a specified size has improved firesafety in industrial and other large facilities.

Although the fire service has been updated and upgraded, changes in Japanese living habits and the heightened threat of danger presented by the modern industrial environment produce increased problems for firesafety. Fire takes about 2,000 lives yearly and causes damages of about 150 billion yen. The change in the structure of cities and buildings as people and industry move to the city, the construction of complex high-rise buildings, and the existence of many underground shopping centers have weakened the cities' defense against fire. Both the types of structures and the materials used for their construction emit dangerous amounts of smoke and poisonous gases when they burn that can obstruct fire fighting, evacuation, and rescue efforts.

Modern lifestyles in Japan have led to a dramatic increase in the production, shipment, and use of gases in transportation, industry, and the home. The number of occupancies where hazardous materials are sold or used, such as filling stations, oil reserves, hospitals, and restaurants, has grown. Arson, nuclear power stations, the rapid increase in the number of cars, and the formation of towns close to petrochemical complexes further complicate the fire problem.

In Japan, no less than in any other modern industrial nation, the fire problem has grown in complexity and the potential for major disasters has increased. The fire service, however, is unprepared for the fire problems of the future. Although it is considered competent to fight ordinary building fires, it is not prepared for fires in high-rise structures and underground stores, nor for incidents involving oil, gas, and radioactive materials. In its 1980 report on the fire service, *White Book on Fire Service in Japan*, Japan's Fire Defense Agency called for "...all the institutions related to fire and disaster prevention, residents and offices to establish the disaster defense system for the whole community." This recommendation translates into:

1. strengthening fire defense capability through modernization and upgrading of facilities and equipment, and improved quality for the staff;
2. improvement of the voluntary disaster prevention program in communities, business, and industry;
3. the comprehensive and concerted promotion of a disaster defense administration to deal with the dangers presented by the use of diversified energy sources and improved living standards.

Nearly half of all building fires in Japan are residential. Thus, the chief focus of fire prevention is how to gain the support of the private citizen for fire prevention and how to promote voluntary fire prevention and protection activities. Women's fire prevention clubs (WFC) that are closely connected with municipal fire headquarters have been instrumental in the pursuit of the latter goal. These clubs are formed by housewives as private volunteer fire prevention organizations for learning and teaching fire prevention in rural and urban areas. As of May 1982, there were about 11,000 clubs with a total membership of about 1.63 million. The Japan Fire Protection Association holds an annual national convention and leader training to promote WFC activities.

The level of private fire protection in Japan also presents problems. Petroleum complexes and those facilities where hazardous materials are handled are required to have fire fighting systems. However, there are no established standards for fire fighting equipment and manpower. Neither are there standards for fire protection equipment and manpower in other structures such as high-rise buildings, underground shopping malls and streets, and large public buildings. The creation of minimum fire protection standards for such occupancies is therefore an urgent need.

(Summarized from remarks made by Masao Yo Koyama, Managing Director, Japan Fire Protection Association and from *White Book on Fire Service in Japan*, 1980, Japan Fire Protection Association, Tokyo, Japan.)

Korea

Rapid industrial development in Korea since 1960 has led to increased fire losses in life and property. In spite of this, there has not been any substantial improvement in fire protection and risk management. Help, however, is on the way.

In February 1973, the Korean government declared the Law on Indemnity for Fire Losses and Fire Insurance. In May 1973, ten non-life insurers in the areas of fire protection service and limited insurance joined together to form the Korean Fire Protection Association (KFPA). The principal goals of the Association are fire prevention, research, and programs aimed at reducing fire losses.

The KFPA conducts firesafety inspections in major cities on occupancies obligated to carry insurance and undergo safety inspections, i.e., buildings of four or more floors, government buildings, hospitals, restaurants, theaters, schools, industrial plants, department stores, and apartments. Inspection reports are forwarded to the appropriate government agencies. These agencies may require improvements as recommended. In such cases, KFPA extends loans to building owners who need to improve their fire protection systems in order to comply with government standards.

KFPA writes fire insurance for the types of occupancies listed earlier. The risks are wholly and equally shared with its member companies. In addition, KFPA donates fire fighting equipment to fire fighting agencies including fire fighting apparatus, communications devices, and inspection apparatus. Since 1973, these donations have amounted in value to $1.9 million (US). Lastly, KFPA publishes and distributes materials for the promotion and education of firesafety.

(Summarized from remarks made by Dai-yong Rhee, President, Korean Fire Protection Association, Seoul, Korea.)

South Africa

South Africa's major fire problem concerns the industrial sector where 100 million rand of 160 million rand (Mar. 1982: 1.05 rand=$1 US) in property loss from fire in 1981 was incurred. (These totals are only for fires aboveground and do not include mining fires.) Efforts are being directed at improving firesafety in industry. The National Standard Building Regulation is currently being prepared by the South African Bureau of Standards and will become mandatory for the nation when passed into law.

Another area where fire prevention efforts are directed is at the community level. Each municipality runs its own fire service; therefore, the level of expertise in fire protection varies throughout the country. Without any national direction, fire regulations are not consistently effective. Since fire brigades are funded by municipal taxes, they are restricted to extinguishing fires within their boundaries. In some cases, brigades have responded to a fire, only to discover it is outside of their district. In these cases, they have let the fire burn. Since mutual aid agreements are becoming more standard, this problem is becoming less frequent.

Reaching the public is another fire problem in South Africa. In 1979, there were more than 400 fire deaths reported, most in residential fires. But since there are two major languages spoken in the white community and 14 languages in the black community, it is extremely difficult to distribute and fund firesafety information. To further complicate the language problem, terminology for fire technology does not exist for the different language groups. So far, radio has been used successfully to get the firesafety message to the various ethnic groups who otherwise could not be reached.

(Summarized from remarks made by Peter R. Davey, Manager, Fire Protection Association of Southern Africa, Marshalltown, South Africa.)

Spain

The firesafety experience in Spain has been less than satisfactory until recently. In 1975, the Centro Nacional de Prevencion de Danos y Perdi — CEPREVEN — was founded with the purpose of promoting firesafety in Spain. Since it began functioning in 1976, the nonprofit association has contributed to assembling the forces of several fire protection interests in a combined effort to improve Spain's fire experience.

CEPREVEN's 280 members are mostly insurers. Funding comes chiefly from the member insurers and association activities. The Spanish government through research grants also contributes to CEPREVAN funding.

The Association achieves its mission to improve Spain's fire experience mainly by research, standards writing, and public education. Since its establishment, it has been involved in writing official firesafety standards for hotels, hospitals, public buildings, industry, and cities. In addition, it has helped write technical rules for portable fire extinguishers, fire hose systems, fire hydrants, automatic fire detectors, water supplies for fire suppression, and sprinklers. CEPREVAN provides technical consultation and research on fire prevention and protection upon request.

(Summarized from remarks made by Miguel A. Saldana, Director, Asociacion de Investigacion para la Seguridad de Vidas y Bienes, Madrid, Spain.)

Sweden

Fire killed 129 people in Sweden in 1980, continuing the ten-year trend there. In 1980, insurance payments totalled $260 million (US).

Fire suppression is the responsibility of the fire service. Approximately one-third of the fire service is full-time paid, while the other two-thirds are part-time. It usually takes four to eight fire fighters and two to three pieces of apparatus to contain a fire. The fire service is also responsible for rescue services, such as during landslides and flooding.

The Swedish Fire Protection Association (SFPA) was organized in 1919 by insurance companies to meet the need for information and to solve common fire protection problems. The nonprofit Association, with headquarters in Stockholm, draws members from four major groups: insurance companies, primary municipalities, industry, and 23 regional fire protection associations. The goal of the SFPA is to support and improve fire protection through information dissemination, education, publishing, and technical consultations. Three separate committees within the SFPA deal with farming, shipping, and electricity.

In 1979, the Swedish Fire Research Board was established to improve fire prevention and fire fighting. Its costs are shared equally by the government and private organizations.

(Summarized from remarks made by Kjell Gunnarson, Swedish Fire Protection Association, Stockholm, Sweden.)

Switzerland

The level of fire protection in Switzerland varies from canton to canton. The Swiss Confederation is made up of 26 cantons ranging in population size from 1,000,000 to 20,000 people. Each canton is fiercely independent to the degree that each has its own fire regulations and each ensures that its regulations differ in some way from those of the neighboring cantons. As can be expected in the larger cantons, fire protection is provided by specialists experienced in the field. In rural areas, however, experienced fire brigades and fire authorities are the exception rather than the rule, and the chief may often be a political appointee who has little knowledge about fire and its hazards. This situation is creating fire problems as industry moves from high rent urban areas to low rent rural areas, where levels of fire protection are less sophisticated and where water supplies for fire fighting are low or nonexistent.

(Summarized from remarks made by Dr. E. Bamert, Director, Brand-Verhutungs-Dienst fur Industrie and Gewerbe.)

United Kingdom

The economic recession of the last decade has taken its toll on firesafety in the United Kingdom. It has led to cutbacks in industry funding for safety such as fire brigades, equipment, and safety professionals. A dominant feature of British fire losses has been the high incidence of large-loss (million pound) fires, especially in storage and warehouse facilities.

The recession, though, has also led to a more exact identification of fire problems and more cost-effective ways to deal with them. For example, over the next few years, the Fire Precautions Act for Existing Buildings, with its very complicated certification procedures, will be replaced with a more logical, sensible, and economical approach to firesafety that deals with identified fire problems. This means that a better targeting of fire problems will be necessary if money is to be used wisely. For example, today life safety requirements are demanding in business and industry where the fewest lives are lost to fire, yet there are no requirements for fire protection in homes, where the most deaths occur. Neither is there any special provision for firesafety for the elderly. Therefore, future legislation will need to be targeted to reduce the fire risk to elderly people in their homes. In addition, the regulations for firesafety in industry and business will need to be targeted to high risk areas, rather than treat every situation evenly as is now the case.

While the Fire Protection Association (FPA), the government, and fire brigades have dealt successfully with the technical problem of fire, arson tends to negate any significant gains. Over the last 10 to 20 years, there has been a tremendous increase in the incidence of arson. This has not been arson-for-profit as much as acts of vandalism. At least 15 percent of all fires in the United Kingdom are started deliberately, and one-third of all large-loss fires are started deliberately. In other words, nearly 50 percent of all major fires are started deliberately.

There is much apathy in the public sector about the protection of property from fire. This attitude presents a real challenge to the general public since schools and community buildings are especially vulnerable to fire.

To promote improvement in these problem areas, the FPA has begun a program to combat arson, has encouraged improved structural safety and automatic fire protection for storage and warehouse facilities, and has increased FPA training facilities.

(Summarized from remarks made by C. Douglas Woodward, Director, Fire Protection Association, London, England.)

International Fire Protection Associations

Many countries have associations dedicated to reducing loss of life and property from fire. Those listed here function broadly in their objectives, but are financed and structured in various ways. Some of the associations are supported by the insurance industry, some partially by government sources, and some are independent.

Very few of the international associations listed here develop codes and standards as is done in the United States by the National Fire Protection Association (see the section on standards). In addition to these associations, there are specialized groups in many countries that serve industry, the fire service, and the general public.

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Legends and Lore

Fire Through the Ages

Since man discovered fire, it has been at once a source of comfort and a source of disaster. Fire has been used to further man's most noble ambitions, yet has been abused to further his most sinister motives. But whether as friend or foe, fire has had an interesting history which is presented here in a timeline format to highlight events involving fire through the ages.

BC

400,000-200,000	Evidence uncovered in China in the 1920s shows that Peking man used fire.
7000	Neolithic agriculturists from the Near East used fire to clear fields and produce ash to use as fertilizer — called the "slash and burn" technique.
1400	Ancient city of Knossos destroyed by fire.
200	Ctesbius of Alexandria invented primitive fire engine. Used by the Greeks and later by the Romans, it was then abandoned for many years.
146	North African city of Carthage burned to ashes by the Romans – 50,000 people slain.

AD

1 AD	Romans organized fire fighters into "Corps of Vigiles."
64	Rome, Italy burned for 8 days. Ten out of 14 wards of city were destroyed.
871-901	Alfred the Great of England initiated first fire prevention laws by ordering people to cover cooking fires at night.
1000	William the Conquerer strengthened existing fire prevention laws.
1600-1700s	Fire used as a weapon during wars.
1608	Jamestown, VA fire destroyed colonists' lodging and provisions just one year after settlement.
1613	Dutch trading ship, *Tiger*, burned in NY Harbor.
1623	Plimouth, MA suffered fire that destroyed provisions and dwellings.
1628	Manhattan dwelling fire resulted in first fire prevention activities for Nieuw Amsterdam (NY). First fire prevention building code went into effect along with mandatory chimney inspection and municipal fire protection.
1631	Boston suffered its first fire; two dwellings burned.
1638	Maryland passed first law making arson a felony.
1648	Peter Stuyvesant organized first volunteer firemen in America and passed fire prevention/protection laws. These laws provided fire wardens for inspection and a "Rattle Watch" to notify residents of fire.
1649	Private Boston citizen developed well on his property.
1652	Boston families received fresh water supplies especially for use in fires. Arson legislation passed.

1653	Boston suffered first major conflagration and 3 children were first recorded US fire deaths. Aftermath of conflagration gave Boston its first fire regulations to prevent fire.
1658	Massachusetts law passed to compensate owners of buildings destroyed by fire.
	Colony of Nieuw Amsterdam received fire fighting apparatus from Burgomaster of Dutch NY: buckets, fire hooks, ladders — this was the first municipal fire fighting system.
1666	Great Fire of London burned for 4 days and left 100,000 persons homeless.
	Dr. Nicholas Barton invented idea of fire insurance. The company later became known as Phoenix Fire Insurance Co.
	Development and improvement of Van der Heijden fire engine. The first engine was called the hand tub or water engine.
1676	Boston fire destroyed dwellings, warehouses, stores and North Meeting House. First use of explosives to hinder fire spread. Boston citizens take oath of allegiance to help stop secret attempts to start fires.
1679	Arson fire destroys a major portion of the built-up center of Boston. Gunpowder storage an added hazard in this fire.
1696	Bucket brigades in operation in America.
1700	Settlement of Charleston, SC practically wiped out by fire.
1716	Early fire plugs ordered in use by English Parliament. This early method lasted more than 20 years.
1717	Bostonians organized themselves into unpaid volunteer fire department. First fire department in American colonies.
1718	First fire engine brought over to America from England.
1720	Mutual Fire Society organized to cover 5 districts in Boston.
1721	Richard Newsham invented effective fire engine in England — water could rise up to 165 feet.
1730s	"Gooseneck" fire engines first designed in the colonies. "Double-decker" engines designed in Philadelphia.
1736	Benjamin Franklin organized the Union Fire Company, the first fire brigade in Philadelphia, PA.
1740	Charleston, SC had its second great fire.
1752	First American insurance company established — Philadelphia Contributorship.
1754	Providence, RI passed a law requiring each household to have a 2-gallon fire bucket.
1759	Savannah, GA purchased a hand engine and townsmen organized a fire company.
1763	Engine men, called Fire Wards, appointed in Providence, RI.
1764	Baltimore, MD founded fire company.
	Ben Franklin founded a fire company in Philadelphia known as "Gentlemen of the Middle Ward."
1772	Antoine Lavoisier, French chemist, reasoned that rather than releasing something into the air, burning material was absorbing some element from the air.
1774	English chemist, Joseph Priestly, discovered oxygen. He reasoned that oxygen was present in the air and being absorbed by burning materials when the object was burned.
1775-1776	Fire used as a weapon in the American Revolution. Alarm bells melted to make cannonballs so there was little warning of fire. Major conflagrations caused by the British were Falmouth, ME; Bunker Hill, MA; and New York City, NY.
1778	Charleston suffered another conflagration losing 250 dwellings, stores, and warehouses.
1779	After still another Charleston conflagration, the hand-in-hand company was formed which consisted of passing buckets from water cart to the fire.

1784	Mutual Assurance Company organized.
1787	Richmond, VA conflagration — fire fighting company organized.
1788	New Orleans destroyed by a fire caused when a curtain blew over an open candle.
1792	Insurance Company of North America was formed.
1797	Newark, NJ organized a fire company and purchased small hand engine.
1798	General Assembly of KY enacted law to form 5 fire engine companies in Louisville — manned by volunteer fire brigades.
1800	John Carey, English inventor, invented first crude automatic sprinkler but it went undeveloped for a long period.
1801	Fire in the Treasury Dept. in Washington, DC led to the establishment of Washington into wards with fire companies.
1803	Cincinnati, OH volunteer fire department established.
1806	In the aftermath of a major fire in Philadelphia, hydrant inspections began.
1807	Early fire prevention activity in Washington, DC resulted in all chimneys being cleaned.
1808	Cincinnati OH Fire Bucket Co. formed.
	A new concept in fire fighting developed with use of leather fire hoses seamed by copper rivets.
	NYC got first working hydrant attached to underground water main.
1811	St. Louis, MO formed first fire department.
	Philadelphia diverted water from storage trunks in the street for use in fire fighting.
	Philadelphia Hose Co. formed.
1812	War of 1812 brought major conflagrations: Capitol Building, State and War Department, Treasury Building, Government Arsenal.
	Increased use of fire rafts (fire ships) to threaten enemy.
1816	Richmond, VA organized the Richmond Fire Society for the purpose of rendering mutual aid.
1817	"Real" hydrant built by George B. Smith of NYC, but was not very effective.
1819	Philadelphia organized a special fire patrol to perform salvage work.
1821	St. Louis, MO organized volunteer fire company.
	Rubber-lined, cotton-jacketed fire hose replaced the riveted leather hose in Philadelphia.
1827	English chemist John Walter invented the friction match containing phosphorous sulfate.
1829	George Braithwaite built first fire engine using steam to pump water.
1830	Fire protection improvements in Richmond, VA brought a water supply system, reservoir, water pump hose and private hydrants.
1832	Horses began pulling engines after Asiatic cholera plague struck firemen.
	Sectional ladders used as first fire escapes by John Braidwood of London.
1835	NYC conflagration brought $20-40 million property loss. Following the fire, private patrols were appointed to cover the city in event of second outbreak.
1837	Milwaukee, WI formed its first volunteer fire company.
1840	Henry R. Worthington invented an independent, direct-acting steam power pump.
	P.R. Hodge built steam engine.
1841	NYC attempted to use steam fire engines but was scorned by volunteers.
1845	William F. Channing of Boston invented the fire alarm telegraph.
1848	Alfred Moore, English engineer, invented the ball hydrant.
1849	San Francisco, CA conflagration caused by arson.
	St. Louis, MO conflagration began on the ship "*White Cloud*."
1850	Cincinnati was the first American city to replace volunteers with the horse-drawn steam fire engine.

Philadelphia, PA fire caused by gunpowder explosion (57 lives lost).

San Francisco, CA fire causes $12 million in property damage. Due to a large number of arson attempts, San Francisco organized vigilante groups to patrol city and watch for arson attempts.

1852 William F. Channing installed central office and 45 street alarm boxes in Boston.

Patent issued for first sprinkler-perforated pipe system — the first recognized installation of fire protection equipment.

1853 Cincinnati, OH formed their first paid fire department.

1854 Jennings Building fire causes 4 deaths in NYC.

1857 Baltimore, MD established first paid fire department.

St. Louis, MO had fully paid steam fire department.

Philadelphia ferryboat *New Jersey* fire (67 deaths).

1858 Crystal Palace fire, NYC.

1860 As a result of a NYC tenement building fire where 20 people died, the Common Council passed an ordinance requiring fireproof stairs or fire escapes.

Cincinnati installed its first fire alarm telegraph.

1861 Milwaukee, WI establishes first paid fire company.

1861-1865 Civil War began and much arson occurred: Lord's Theater, Washington, DC; President Lincoln's private stable; US Government Arsenal, Washington, DC; Washington, DC fire; Savannah, GA fire; Richmond, VA fire.

1861 Washington, DC fire department became fully paid organization and installed fire alarm telegraph.

1863 NY draft riots occur. NYC becomes paid fire department.

San Francisco, CA used horsedrawn apparatus.

1864 Stewart Harrison, English inventor, produced the automatic sprinkler.

1866 Portland, ME conflagration.

1870 Philadelphia, PA gets paid fire department.

Daniel Hayes invents first aerial ladder truck raised by a hand crank.

Invention of first hose elevator.

1871 Los Angeles, CA organized first volunteer unit.

Philadelphia, PA fire marks are discontinued.

300 lives lost in the Great Chicago Fire.

Standardization of fire fighting equipment.

1872 Great Fire of Boston destroyed a square mile of the business district.

As a result of the Great Fire of Boston, more than 70 insurance companies went bankrupt. Those companies that survived formed the National Board of Underwriters to set up safeguarding rules for insurance companies to follow.

New building laws pass country-wide.

1873 Suspended harness invented by firemen in St. Joseph, MO.

First sliding poles (of wood) installed in some NY fire departments.

Quick-hitch collar and harness invented by Cambridge, MA fireman Charles Berry.

1874 Automatic sprinklers introduced.

1876 Brooklyn Theater Fire.

1879 Watch towers introduced.

1880 Frederick Grinnell improved upon the automatic sprinkler. Insurance companies cut rates to businesses installing Grinnell sprinklers.

1884 Sioux Falls, SD bought large bell and mounted it on a tower for fire warning.

1888 Fire in the state penitentiary in Richmond, VA.

1889 Seattle, WA fire.

Spokane, WA fire.

Boston, MA conflagration.

1894 Underwriters Laboratories established to develop tests to measure fire resistance of various materials.

1895 National Fire Protection Association established by a group of men uniting to draw up a standardized approach to sprinklers.

1900 North German Lloyd Steamship fire in Hoboken, NJ claimed 326 lives. Waterfront fires became a major concern.

1903 Rhodes Opera House fire, Boyertown, PA (170 deaths).

Iroquois Theater fire, Chicago, IL (602 deaths and 250 injuries).

1904 Successful breathing apparatus invented but not adopted for a number of years.

General Slocum, an excursion steamer with combustibles on board, had a fire and 1,030 lives were lost. This fire lead to inspection of ships in NY Harbor.

Baltimore, MD conflagration raised national attention for the need for standardized fire hose couplings and screw threads.

1905 Fire in Grover & Company shoe factory, Brockton, MA (50 deaths).

1906 Worst conflagration in American history thus far occurred when earthquake/fires hit San Francisco, CA — 492 deaths and $350 million property damage.

1907 Gasoline-powered motors and pumps begin to appear in the fire service.

Underwriters Laboratories initiated its factory inspection service and began to issue labels for "approved devices."

Invention of first pumper with a single engine to do both driving and pumping.

1908 Fire at Lakeview Grammar School, Collinwood, OH (175 deaths).

Chelsea, MA conflagration burned 3,500 buildings and took 18 lives.

1909 Theater fire, Acapulco, Mexico (250 deaths).

Regular inspections in Cincinnati, OH reduced the number of fire alarms.

1910 Fire in the Nelson Morris Co, Chicago, IL — 21 firemen killed by falling wall.

NYC fire — Grand Central terminal yard.

Transport of hazardous materials quickly becoming a great hazard to man.

1911 Triangle Shirtwaist Factory fire, NYC (150 deaths).

NYC created Committee on Safety which led directly to Safety to Life Committee of NFPA.

NY organized Bureau of Fire Prevention and established its fire college.

1912 Equitable Building fire in NYC, NY.

1913 *Life Safety Code*® established.

Binghamton Clothing Factory fire results in new standard for building exits (35 deaths).

Single-driving and pumping engine developed to efficiency.

1916 Fire at Paris, TX — spread by wooden shingle roofs.

Black Tom Pier fire and explosion in NJ.

1917 First Building Exits Code developed.

Ammunition storage explosion, Halifax, N.S. (1,500 deaths).

Eddystone Ammunition Corporation explosion, Eddystone, PA (133 deaths).

Collision of SS *Mont Blanc* and SS *Imo*, Halifax, N.S. (1,800 deaths).

1918 International Association of Firefighters Union organized.

Fire at Oklahoma State Hospital for Insane, Norman, OK (38 deaths).

Hydroplanes used in San Diego, CA for waterfront fires.

Grey Nunnery fire in Montreal, Canada resulted in the deaths of 33 babies.

Forest fires, MN (559 deaths).

Smoking restricted in NY State factories.

1919 Dance hall fire in Ville Platte, LA (25 deaths).

Establishment of Swedish Fire Protection Association.

Two-platoon system begins in NYC — many cities had already adopted shorter hours for firemen.

1921 *National Electrical Code®* established.
California passed a bill forbidding wooden shingles on roofs; pressure from industry brought a repeal.
San Lazaro, Manila conflagration.

1922 Last horse-drawn engine in NYC retired.
President Harding issued first Fire Prevention Week proclamation — all other Presidents followed tradition.
Standards for Municipal Fire Alarm systems adopted.
Aalborg, Denmark conflagration.

1923 Cleveland School Fire in Beulah, SC (77 deaths).
Tokyo and Yokohama earthquake and conflagration, Japan (91,344 deaths).
Manhattan State Hospital fire (27 deaths).
Fire at Illinois State Hospital, Dunning, IL (18 deaths).
US Chamber of Commerce sponsors National Fire Waste Council with contest for fire prevention in cities by local chamber of commerce.
Fire prevention education in schools required by 13 states.
American Petroleum Institute organized a Fire Prevention Committee (still active today).

1924 Babbswitch, OK schoolhouse fire (32 deaths, 37 injuries).

1925 Kevin Hall fire in Glasgow, Scotland.

1926 Roofing materials tested in Canada by the Dominion Fire Prevention Association.
Mexico City, Mexico movie picture theater fire.
Shakespeare Memorial Theater fire, Stratford-on-Avon.
Movie picture theater fire, Drumcollogher, Ireland (50 deaths).

1927 Annual Fire Prevention Week inaugurated.
Hospice St. Charles fire, Quebec, Canada.
Motion picture theater fire in Tammerfers, Finland (21 deaths).

1928 Theater fire in Madrid, Spain started by short circuit (68 deaths).
Fire in Fall River, MA burns 107 factories and business blocks.
Aviation fires beginning to receive serious attention.

1929 Cleveland Clinic fire results in poisonous fumes from burning X-ray films (125 deaths).
Glen Motion Picture Theater Fire, Paisley, Scotland — 70 children die and 37 injured due to panic and trampling.
Perfumery store fire, Venice, Italy.
Stock market crash had devastating effect on fire department budgets. Loss of manpower and stations resulted; incendiary fires increased.
Fires in the White House and the Capitol, Washington, DC, drew attention to the need for better protection of federal properties.

1930 Ohio State Penitentiary fire, Columbus, OH (320 deaths).
NFPA Aviation Committee recommends good practice requirements for firesafety and life safety in aviation.
Sunday Creek Oil Co. coal mine gas explosion, Millfield, OH (83 deaths).
Norwegian Royal Residence fire, Oslo, Norway.

1931 Dwelling inspections carried out by fire departments in Providence, RI and Arlington, MA.
New Zealand earthquake and fire (250 deaths).
Managua, Nicaragua earthquake and conflagration (1,000 deaths).

1932 Burlington Railroad fire, Chicago, IL.
Pulpwood fire, Port Alfred, Quebec.
Tokyo Department Store fire, Tokyo, Japan.
Reichstag fire, Germany.

1930-1933	Comprehensive fire loss study estimates that most fire deaths involving the very old and the very young occur in ordinary dwellings.
1934	*S.S. Morro Castle* fire off the NJ coast (125 deaths).
	Conflagration in Hakodate, Japan destroys one-half of the city and takes 2,018 lives.
1936	Fire in Pruitt Hardware Company, Gainesville, GA following tornado (57 deaths).
1937	Consolidated School fire in New London, CT gas explosion (294 deaths). This fire focused attention on the need to safeguard buildings not subject to municipal ordinances.
	German zeppelin *Hindenburg* burned as a result of an engine spark igniting flammable hydrogen (36 deaths).
1938	Fireworks accidents numbering 1,702 in one year lead Pennsylvania to adopt fireworks law.
	Changsha, China conflagration (2,000 deaths).
	Attic Photographic Studio fire, Oslo, Norway.
	Sacred Heart College, St. Hyacinthe, Quebec coal gas explosion (46 deaths).
1939	Chicago, IL dust explosion fire.
	Incendiary bombs dropped on European cities.
	Insane Asylum fire, Gifford, Quebec.
	Queen Hotel fire, Halifax, N.S. (28 deaths).
	Steamship *Paris* fire, LeHavre, France caused by oven fires left burning in ship's bakery.
	Munitions factory, Hirakata, Japan (200 deaths).
1940	Fire storms in cities all over the world.
	Rhythm Club dance hall fire, Natchez, MS (207 deaths).
	Newsprint paper fire, Addington, New Zealand.
	Colon, Panama conflagration.
1941-1945	Bombing of Pearl Harbor resulted in loss of 2,383 lives and 19 American ships. Other losses - $25 million damage to aircraft, $25 million damage to buildings, supplies and ammunitions, 88 ships damaged and 960 persons missing.
	Pearl Harbor experience led to fire training program of the US Navy.
	Japanese and European cities destroyed by war conflagrations.
	Firestone Tire and Latex Co., Fall River, MA fire.
1942	*Normandie/US Lafayette* fire resulting from a spark from a welding torch igniting life preservers.
	Cocoanut Grove Night Club fire, Boston, MA (492 deaths). This fire showed the need for practical improvements. UL stepped up research on combustibles in public places.
	Blood plasma used in treatment of burns.
	Recreation hotel fire, St. John's, Newfoundland (99 deaths).
1943	Gas rationing presents new hazard of gas storage.
	Use of space heaters and makeshift heating devices poses new hazards.
	"Rain of Terror," Hamburg, Germany. Fire storms killed 60,000 - 100,000 people.
1944	Ringling Bros. and Barnum and Bailey Circus Tent fires Hartford, CT (162 deaths and 200 injuries).
	Ammunition ship exploded Bombay, India (700 deaths).
	U.S.S. Mount Hood, ammunition ship, at anchor in Seeadler Harbor, Manus Island, Admiralty Islands — explosion of ammunition (373 deaths).
	East Ohio Gas Co. fire, gas explosion, Cleveland, OH (130 deaths).
	Munitions Depot explosion, Port Chicago, CA (300 deaths).
1945	Dresden, Germany, explosive incendiary bomb raid (300,000 deaths).
	Eastern Air Lines DC-3 near Florence. S.C., fire in flight (22 deaths).

Empire State Building struck by aircraft (14 deaths).

1946 LaSalle Hotel fire, Chicago, IL (61 deaths).

Hotel Canfield, Dubuque, IA (19 deaths).

Winecoff Hotel fire, Atlanta, GA (119 deaths).

1947 *The Markey* — petroleum tanker fire in Los Angeles, CA. Fireboats used to fight miles of waterfront fire.

Grandcamp fire, Texas City, TX, ammonium nitrate explosion (400 deaths).

Centralia Coal Co., Centralia, IL dust explosion (111 deaths).

England Fire Protection Association established.

Ammunition depot fire, Cadiz, Spain (300 deaths).

Department store fire, Christchurch, New Zealand (41 deaths).

1948 DC4 accident at Chicago Municipal Airport (12 deaths). This fire recognized the need for specialized aircraft rescue and fire fighting vehicles for airports.

Earthquake/conflagration at Fulcui, Japan (3,000 deaths).

3-cent stamp honors volunteer firemen.

1949 St. Anthony's Hospital fire, Effingham, IL (74 deaths).

Holland Tunnel fire, NY — truck loaded with 48,000 lbs. of carbon disulphide.

Noronic ship fire, Toronto (124 deaths).

Chungking, China conflagration (2,513 deaths).

Pictorial training manual published by International Association of Fire Chiefs and Fire Department Instructors.

1950 Mercy Hospital fire, Davenport, IA (41 deaths).

Epidemic of nursing home fires.

1951 Lansing, MI State Office Building suffers $5 million fire — irreplaceable records and plans lost.

Sparky the Fire Dog created as a symbol of fire prevention for children.

Project East River.

C. W. & F. Coal Co., W. Frankfurt, IL gas explosion (119 deaths).

1953 Society of Fire Protection Engineers received charter in Chicago, IL.

General Motors Corporation fire, Livonia, MI.

Torch sweater fires lead to Flammable Fabrics Act.

1954 Cleveland Hill School fire, Cheektowaga, NY (15 deaths).

Oil refinery fire in Whiting, IN resulted in $16 million loss — explosion and boilover.

Church-Wiley bill prohibits shipment of fireworks into any state where fireworks prohibited by state law.

USS Bennington explosion en route to Narragansett Bay, RI (106 deaths).

Junior Fire Department in Los Angeles, CA organized.

1955 Barton Hotel, Chicago, IL (29 deaths).

1956 Spheroid tank rupture kills 19 and injuries 32 at Shamrock Oil and Gas Corp, Texas.

1958 Our Lady of Angels School, Chicago, IL — rubbish fire spread through open stairway (95 deaths).

Amateur rocketry poses new hazards.

Vida department store fire, Bogota, Colombia (83 deaths).

Business district fire, Lanark, Ontario.

Bermudiana Hotel fire, Hamilton, Bermuda.

1959 Stalheim Hotel fire, Stalheim, Norway caused by smoking in bed (26 deaths).

Conflagration, Vastervik, Sweden.

Prison barracks fire, Koulion, Finland.

Haderslev Park Lake fire, Sutland, Denmark — excursion boat burned by ignition of gasoline on motor.

1960 Matson Navigation Co. fire, Los Angeles, CA caused by a welder's torch. Scuba firemen used for first time.

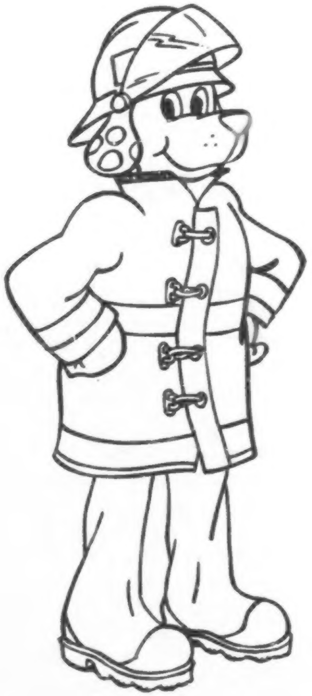
Fire in bonded whiskey warehouse in Glasgow, Scotland took lives of 9 firemen.
Guatemala mental hospital fire (170 deaths).
Movie house fire in Syria (163 deaths).
Brooklyn, NY, fire on aircraft carrier, *USS Constellation*, nearing completion (50 deaths).
Australian Fire Protection Association established.
1961 Hartford Hospital fire, Hartford, CT (16 deaths).
Brazil circus tent fire (400 deaths).
Chicago, IL introduced first fire boat.
1962 Coal mine explosion, Saarbucken, Germany (290 deaths).
Nursing home fire in Fitchville, OK (63 deaths).
Department store fire in Tokyo, Japan (7 deaths).
1963 Fire in 14-story hotel in Jacksonville, FL (21 deaths).
Indiana State Fairgrounds Coliseum, Indianapolis, IN (74 deaths).
Golden Age Nursing Home, Fitchville Township, OH (63 deaths).
Roosevelt Hotel, Jacksonville, FL (22 deaths).
Surfside Hotel, Atlantic City, NJ (25 deaths).
Denpassau, Bali earthquake and conflagration (1,000 deaths).
1965 Louisville, KY industrial plant fire (12 deaths). For the first time fire fighters were attacked and harassed.
Multiple fires resulting from Watts riots in Los Angeles, CA. After 34 lives were lost, special gear was used to protect fire fighters as a defense.
Passenger train fire near Zaragoza, Spain — wooden coaches (26 deaths).
U.S. Navy Communications Center fire, Kamiseya, Japan.
1966 Fire department strikes in Atlanta, St. Louis, and Kansas City. The IAFF did not sanction the strike.
1967 McCormick Place fire, Chicago, IL (1 death).
Apollo Space Capsule fire, Cape Kennedy, FL — 3 astronauts died. A fire resistive fabric, Nomex,® came into existence.
Brush fires in Tasmania (62 deaths).
Cornell University, NY fire claims 9 lives.
Department store fire, Brussels, Belgium (325 deaths).
Berrydale, FL prison fire — a result of rioting (38 deaths).
Forrestal aircraft carrier fire off coast of Vietnam (131 deaths).
Dale's Penthouse restaurant fire, Montgomery, AL (25 deaths).
Coal mine explosion, Turon, Spain — methane gas exploded when ignited by lamp flame (11 deaths).
1968 "No strike clause" deleted from International Association of Fire Fighters constitution.
Marting Arms fire (sporting goods store), Richmond, IN — gunpowder explosion (41 lives).
Mental hospital fire, Shrewsbury, England (24 deaths).
1969 Hawthorne house apartment building fire, Chicago, IL (4 deaths).
Apartment house fire, Kansas City, MO — dumbwaiter shaft spread fire throughout building (12 deaths).
Aircraft carrier fire — 75 miles south of Pearl Harbor.
Atomic Energy Commission Plant fire, Golden, CO.
Princess Lalla Hasmaa Home for Children fire, Casablanca, Morocco — 6 babies died.
Home for the Aged fire, Notre Dame du Lac, P.Q. (40 deaths).
1970 Pioneer Hotel fire, Tucson, AZ (28 deaths).
Convalescent home fire, Marietta, OH (32 deaths).
Two New York City fires resulted in NYC establishing a comprehensive fire

prevention code for high-rise buildings.
Ozark Hotel fire, Seattle, WA (20 deaths).
Dance hall fire in Grenoble, France (146 deaths).
Ponet Square Hotel fire, Los Angeles, CA (19 deaths).
1971 Equipment plant fire, Pas De Calais, France.
Chemical plant fire, Woodbine, GA — violent explosion and fire (25 deaths).
Hotel fire, Seoul, Korea (163 deaths).
Nursing Home fire, Beuchel, KY (10 deaths).
Floating restaurant fire, Hong Kong (34 deaths).
Nursing home fire, Honesdale, PA (15 deaths).
1972 Andraus Building high-rise fire, São Paulo, Brazil (16 deaths).
Careless match disposal causes fire in multi-occupancy building in Osaka, Japan. Heat and toxic gases caused 118 deaths.
Silver Mine fire, Kellogg, ID — toxic gases through ventilation system, inadequate breathing aids (91 deaths).
Coldharbor Mental Hospital fire, Shelborne, England (30 deaths).
Wagon Wheel night club fire, Montreal, Quebec — incendiary origin (37 deaths).
1973 Kingman, AZ fire — rail tank car (13 deaths).
Apartment house fire, Los Angeles, CA (25 deaths).
Summerland Leisure Center fire, Isle of Man (50 deaths).
Avianca Building, Bogota, Colombia fire (4 deaths).
Aircraft crash, Boston, MA — instrument landing in fog (46 deaths).
Department store fire, Kumamato, Japan (103 deaths).
Gas storage tank fire, Staten Island, NY — polyurethane insulation (40 deaths).
Caixa Economica Building fire, Rio de Janeiro, Brazil.
1974 Hotel fire in Seoul, Korea.
Discotheque fire, Port Chester, NY — incendiary fire in adjacent occupancy (34 deaths).
Joelma Building fire, São Paulo, Brazil.
1975 LP-Gas transport truck explosion in Eagle Pass, TX (19 deaths).
Jail fire, Sanford, FL (11 deaths).
B727 plane crash and fire, NY; spilled fuel ignited after crash (113 deaths).
1976 Social Club fire, Bronx, NY (25 deaths).
Nursing home fire, Chicago, IL (24 deaths).
Pathfinder Hotel fire, Fremont, NE — natural gas explosion (20 deaths).
1977 Dormitory fire, Providence, RI (10 deaths).
Stratford Hotel fire, Breckenridge, MN (16 deaths).
Supper Club fire, Southgate, KY (165 deaths).
Saint John City Detention Center fire, Saint John, New Brunswick (2 deaths).
County Jail fire, Columbia, TN — incendiary origin (42 deaths).
Filipinas Hotel fire, Phillipines (47 deaths).
1978 Train derailment fire, Waverly, TX — LP-Gas tank car BLEVED.
Institution for Mentally Retarded fire, Ellsville, MS (15 deaths).
Contes House Hotel fire, Kansas City, MO (20 deaths).
LP-Gas tank truck fire, near Mexico City, Mexico (12 deaths).
1979 Boarding home fire, Farmington, MO (25 deaths).
Woolworth's Department Store fire, Manchester, England.
Halfway house fire, Washington, DC (10 deaths).
Houston, TX Conflagration.
County Jail fire, Lancaster, SC (11 deaths).
Ohio Boarding home fire, Pioneer, OH (14 deaths).
1980 MGM Hotel fire, Las Vegas, NV (85 deaths).
Boarding home fire, Bradley Beach, NJ (24 deaths).

	Stouffer's Inn hotel fire, Harrison, NY (26 deaths).
	Opemiska Social Club fire (48 deaths).
1981	Group live-in facility fire, Keansburg, NJ (31 deaths).
	Group live-in facility fire, Point Pleasant Beach, NJ (7 deaths).
	Hilton Hotel fire, Las Vegas, NV (8 deaths).
	Adult Foster Care Home, Detroit, MI fire.
	Lynn, MA conflagration.
	Royal Beach Hotel, Chicago, IL fire (19 deaths).
1982	Hotel New Japan, Tokyo, Japan fire (32 deaths).
	Westchase Hilton, Houston, TX fire (12 deaths).
	Conrad Hilton Hotel, Chicago, IL fire (4 deaths).
	K-Mart Warehouse, Bucks County, PA fire.

Fire Service Traditions

Sparky the Fire Dog



Sparky the Fire Dog, the friendly-looking character with a dalmatian's face, dressed in fire fighter's turnout gear from helmet to boots, is synonymous with firesafety to millions of American school children and their families.

Sparky was "born" in 1954 to carry the public firesafety messages of the National Fire Protection Association (NFPA). Since then, he has acquired a loyal following throughout the United States and Canada, in factories, on military bases and at government facilities as well as in the classroom. He has become the symbol of firesafe practices everywhere.

In his early years, Sparky looked mainly like a dalmatian, complete with whiskers and a long tail, wearing firemen's jeans. Through the years, with the help of some professional recognition factor studies, Sparky has evolved to today's figure: still friendly-looking, but with a no-nonsense stance. He wears the recommended type of helmet with a facepiece for added safety, and a turnout coat, trousers and boots for maximum protection in a fire.

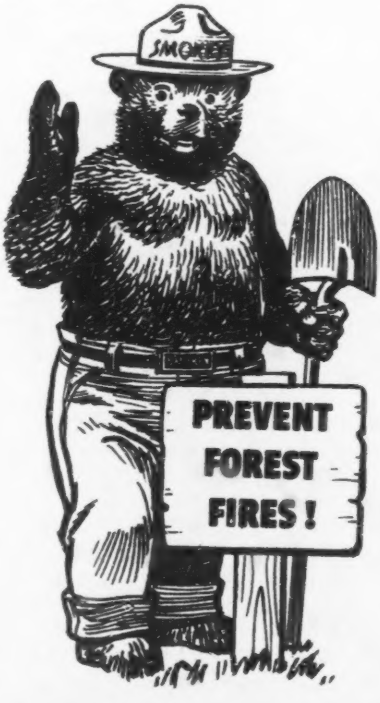
The choice of a dalmatian as the basis for Sparky was an obvious one, as was the Sparky name. Dalmatians have shared the barns and the hunt courses with horses for centuries. Look closely at any good English hunt print and you'll see dalmatians racing across the fields along with the hunters on horseback. When fire apparatus was horse-drawn, nearly every firehouse had its resident dalmatian to help direct the horses, keep the horses company, and guard the firehouse. Some dalmatians stayed behind when the apparatus was rushed to a fire; others rode on the fire truck and were as much a part of the fire scene as were the fire fighters themselves.

Firehouse dogs nearly always were called "Sparky," so "Sparky" was the obvious name for NFPA's fire prevention symbol.

Motor apparatus long ago replaced horse-drawn fire engines, but dalmatians — many called "Sparky" — still are found in fire stations throughout the United States. As in the days of old, many enjoy riding the engine to the fire scene, while others stay to guard the firehouse until the fire fighters return.

Smokey Bear - Prevention Success in a Funny Hat

(Source: Forest Service, U. S. Department of Agriculture)



A strong nationwide effort in wildfire prevention was begun in 1942. It was a cooperative project from the beginning, with state foresters, the Wartime Advertising Council, and the Forest Service involved. A poster featuring Smokey Bear was circulated in 1945. This symbol soon became very popular. In fact, a recent survey showed "Smokey" as a known symbol to almost all Americans.

Canada and Mexico also participate in the Smokey Bear fire prevention program. The Canadian Forestry Association is the official agent in that country for Smokey Bear publicity materials and distributes them to the provinces. Mexico uses the "Bear" symbol, calling him "Simon El Oso" (Simon the Bear).

The Smokey Bear program has been one of the most effective campaigns in history using an animal symbol to influence public opinion favorably in combating a serious national problem. Since the campaign began, wildfires have dropped dramatically both in number and in total area burned. Smokey has proven both an authoritative and lovable figure.

The slogan, "Only You Can Prevent Forest Fires" coined in 1947, has proven so effective that it is still used regularly in posters, radio and television public service announcements, ads, flyers, etc. Since it was found that young children playing with matches start many forest fires, a companion theme was added to Smokey's Cooperative Forest Fire Prevention Program. It is "Smokey's Friends Don't Play With Matches." It, too, has been effective. These messages are taken very seriously by children, who often chide their own parents for bad habits with fire.

To give youngsters the feeling of direct participation in preventing wildfires, a nationwide Smokey Bear Junior Forest Ranger program was developed in 1953. Most ranger appointments are made at Smokey Bear Headquarters in Washington, DC 20052. But some state forestry agencies cooperate by distributing these kits in their areas.

All 50 states participate in the cooperatiave prevention program, through state and local forestry and park and fire management agencies and agencies in the U.S. Department of the Interior, as well as other federal departments with extensive landholdings. Outdoor sports, conservation, service, and youth organizations, and their state and local affiliates also cooperate as do forest industry groups.

Special independent campaigns have been carried out by organizations like the American Forestry Association (AFA) and the American Forest Institute (AFI, formerly the American Forest Products Industries (AFPI). The AFPI in 1941 sponsored the "Keep Washington (State) Green" project, which soon spread to Oregon and many other states, and is now active in 38 states. The American Forestry Association in 1928 started an educational campaign in the south against the prevalent custom of woods burning, using a traveling movie exhibit. In 1956, AFA started another campaign in the south with strong support from the state foresters. Two years later, the Forest Service of the U.S. Department of Agriculture and the Advertising Council joined AFA and state forestry agencies in organizing a long-range publicity drive against incendiarism and careless debris burning in the south. The campaign is still continuing. The aim is to change the attitude of the general public toward such burning, so that everyone will see the incendiary as a person who is causing harm to society and therefore must be curbed. Efforts are also being carried on in the northeast and midwest where incendiarism and debris fires are very serious. State forest fire laws and their enforcement are being strengthened in the effort.

St. Florian and the Fire Service

(Source: Cork Fire Brigade Centenary Review, 1877-1977. Cork Corporation Fire Department, Ireland.)

Florian was born about 250 A.D. in Cetium, which is now Weisselmauer, Austria. He joined the Roman army as a youth, and, through diligence to duty, advanced through the ranks. By the year 305, his administrative abilities had won the high regard of Emperor Diocletian and his chief aide, Maximian.

Thus, Diocletian was shocked when he learned that Florian was not carrying out his edict to persecute all Christians in the area. Aquilinus, a man historians describe as a "ruthless enforcer," was dispatched to Eastern Bavaria with orders from Maximian to "slaughter all believers in Christ" and to investigate Florian's behaviour. Leaving a trail of blood behind him, Aquilinus confronted Florian in Lorch, and sentenced him to death by fire.

Standing on his funeral pyre, Florian is reputed to have challenged the Roman soldiers to light the fire, saying, "If you do, I will climb to heaven on the flames." With apprehension, Aquilinus abandoned the idea of burning Florian. Instead a millstone was tied around Florian's neck and he was drowned in the nearby river Enns. Valerie, a pious lady, had his body recovered and buried him on her country estate.

About 600 years later, sometime between 900 and 955, a monastery was erected near the tomb, and subsequently the village of St. Florian grew up around it. This monastery, under the care of the Augustinians since 1071, is one of the oldest in the world and is a sanctuary for art treasures. Following ancient custom, pilgrims assemble at the monastery's church each year on 4 May, St. Florian's feast day, to participate in special services.

St. Florian was adopted as patron saint of Poland after Pope Lucius III consented to the request of King Casimir to send relics of Florian to that country. Soon after, a person was saved from a fire by invoking St. Florian's name. Since then, Florian has been invoked against fire and has generally been regarded in most countries as the patron saint of the fire service.

Fire Marks

Valued today as collector's items, fire marks once meant the difference between receiving organized help in fighting a fire or no help at all.

Starting in Philadelphia in 1752, each fire insurance company developed its own distinctive fire mark which might be likened to a corporate "logo" today. As a firm designed its fire mark, it had copies cast in lead or carved of wood and painted. It then nailed one fire mark in a conspicuous place on each building it insured.

Insurance companies next began to offer rewards for fire fighting assistance in saving their properties. Fire marks — or their absence — helped competing fire brigades decide whether or not it was worth their while to try to extinguish a fire.

At the sound of a fire alarm, every brigade within earshot responded "in a furious dash," according to one writer. "It was the case of winner take all, the first company arriving having the undisputed privilege of dealing with the flames. If a house bore a fire mark — no matter whose — it was a guarantee that the brigade succeeding in beating the fire would receive its just due from the insuring company. Burning houses bearing marks therefore received energetic attention. But if a piece of burning property bore no fire mark, the gallant volunteers more often than not quickly left." (From "Fire Marks," copyright 1938 by the American Reserve Insurance Company, New York City.)

In 1752, the first fire mark appeared in America. This was also the year of the founding of the first American fire insurance company, the Philadelphia Contributionship. The new firm based its mark on a design used in London as early as 1714. The emblem was known as a "Double Hand-in-Hand," depicting two pair of hands, each hand grasping the wrist of another, with the resulting square formation mounted at an angle to form a diamond. The clasped hands were in an arrangement commonly known today as the "Boy Scout Grasp" or, in England, the "Lady-to-London" grip which is almost unbreakable, signifying great strength and said to also represent trust, faith and goodwill.

Some early insurance companies decided not to insure houses with trees nearby, because trees often caught fire and helped spread flames from one structure to another. Citizens who wanted both trees on their property and fire insurance organized the Mutual Assurance Company in 1784 and, almost inevitably, chose "The Green Tree" as their fire mark.

Following the Hand-in-Hand, Green Tree, American Eagle, and other early fire mark designs with ideological and patriotic origins, came marks reflecting developments in fire fighting. Designs showing a fire hydrant with hose attached, a fire engine, and a fire hydrant, reflected the gradual improvement in apparatus.

The use of fire marks generally declined after 1871, when Philadelphia instituted its first paid city fire department. Fire marks were issued rarely after that time, and only for advertising purposes.

Many fire museums have at least a few fire marks in their collections for visitors to enjoy. One of the largest American collections of fire marks was gathered by Harold V.

WE WANT TO KNOW . . .

if a name, an address, or a phone number has changed; if there's an upcoming event, a new program or course, a new publication being offered. If you have more current information than is contained in this *Almanac*, know something that should be included in this book, or just have something interesting about the fire protection scene that you want to contribute, please let us know. Write: Editor, *Fire Almanac*, NFPA, Batterymarch Park, Quincy, MA 02269. All suggestions will receive our careful attention.

Green Tree (Courtesy Insurance Company of North America)

Hand-in-Hand (Courtesy Insurance Company of North America)

Smith, former President of The Home Insurance Company, and housed until recently in the firm's skyscraper headquarters in New York City. The entire collection is being merged with historic holdings of the New York City Fire Department. Early in 1983, the joint collection is expected to be open to the public in a newly restored landmark firehouse in lower Manhattan. Among the major reference books on fire marks is *Footprints of Assurance* by Alwin E. Bulau, published in 1953 by The Macmillan Company, New York, and copyrighted by The Home Insurance Company.

Fire Service Recognition Day

The second Saturday in May annually is Fire Service Recognition Day as designated by the International Association of Fire Chiefs (IAFC). This day is designed "to focus attention on the varied and technical services being offered by fire departments of the United States and Canada."

Emphasis is on the fact that, in the IAFC's words, "Today's firemen are technically trained and highly skilled professional public servants. They perform many public services in addition to the suppression of fire, such as dwelling inspections, pre-fire planning, inspections of commercial industrial facilities, hospitals, schools and rest homes."

On Fire Service Recognition Day, "citizens are urged to visit their nearest fire station to become acquainted with these men, their apparatus and equipment and the professional type service they provide."

Date for 1983: Saturday, May 14.

For a brochure on suggested activities, a model Mayor's Proclamation and other helpful materials, write the IAFC, 1329 - 18th St. NW, Washington, DC 20036

Fire Fighters Memorial Sunday

The first Sunday of October has been designated "Fire Fighters Memorial Sunday." Sponsored by the International Association of Fire Fighters (IAFF), it began October 7, 1979, with the first Presidential Proclamation for Fire Fighters Memorial Sunday, signed by President Jimmy Carter.

The resolution calling for establishment of a Memorial Sunday was introduced by Fort Worth, TX, Local 440 of the IAFC at the 1976 IAFC national convention, held in Denver, CO. The first observance, three years later, fell during the visit of Pope John Paul II to the United States; the Pope was in Washington, DC on Sunday, October 7, 1979.

Date for 1983: Sunday, October 2.

Further information is available from the IAFF, 1750 New York Ave. NW, Washington, DC 20006; (202) 872-8484.

Fire Prevention Week

Sponsored by the National Fire Protection Association (NFPA), Fire Prevention Week (FPW) is always the full week — Sunday through Saturday — that includes the date of October 9.

The ninth of October marks the anniversary of the "Great Chicago Fire of 1871" which killed 250 people, left 100,000 homeless, destroyed 17,430 buildings and blackened 2,100 acres at a cost of $168 million. A national interest in fire prevention as well as fire fighting emerged as a result of this fire. The ideas of using building materials that wouldn't catch fire quickly, separating buildings, and widening streets to prevent fire from spreading easily soon developed.

In 1911, the Fire Marshals Association of North America (now the Fire Marshals Section of NFPA) suggested that the 40th anniversary of the Chicago fire be set aside as a time to advise the general public about the need for fire prevention. The Fire Marshals Association sponsored the first Fire Prevention Day on October 9, 1911.

President Woodrow Wilson issued the first national Fire Prevention Day proclamation on October 9, 1920.

Since 1922, Fire Prevention Week has been the Sunday-through-Saturday period including the date of October 9, and since that year NFPA has been the sponsor of FPW. President Warren G. Harding proclaimed the first Fire Prevention Week, October 2-9, 1922, to be observed "by every man, woman, and child, not only during the week designated in this pronouncement but throughout every hour of every day of the year."

Each year, NFPA selects an official Fire Prevention Week slogan and produces the official FPW poster. Activities to observe FPW are conducted at the local level, and are usually sponsored by the Fire Department, Chamber of Commerce, and/or other community organizations. Popular activities include parades, open house at the fire stations, exhibits, essay and poster contests conducted in the schools and in Scouts and other youth groups, and door-to-door home fire inspections accompanied by handouts of fire prevention literature.

Since 1966, Operation EDITH (Exit Drills In the Home) has been an important part of Fire Prevention Week in many communities. EDITH encourages families to plan ahead for escape in case of fire, and to join their neighbors in a simultaneous "rehearsal" of their escape plans. EDITH generally is scheduled for 8 o'clock p.m. on the Wednesday in Fire Prevention Week.

EDITH was introduced in Kansas City, MO in 1958. Since 1966, it has been sponsored by the Fire Marshals Association of North America, the Fire Marshals Section of NFPA.

Canada traditionally observes FPW at the same time the United States does, with a national proclamation issued each year by an official of the Canadian government.

Materials to support local FPW activities are available from NFPA around the first of

June each year. The Marketing Division provides the FPW Promotion Kit that contains the current poster, other print and audiovisual materials for audiences of all ages, and quantity prices. The Public Affairs Division distributes the free Media Kit of sample articles for newspapers and magazines and the free Public Service Announcements Kit of "spots" for use on radio and as scripts for TV.

Write to both Marketing and Public Affairs at NFPA, Batterymarch Park, Quincy, MA 02269, or telephone (617) 328-9290. Orders for Fire Prevention Week materials are taken by the Publications Sales Division, (617) 328-9230.

Future Fire Prevention Week Dates at a Glance

1983 - October 9-15
1984 - October 7-13
1985 - October 6-12
1986 - October 5-11
1987 - October 4-10
1988 - October 9-15
1989 - October 8-14
1990 - October 7-13

National Fire Prevention Week Slogans 1957-82

Don't Give Fire a Place to Start — 1957, 1958, 1960, 1961, 1963, 1965
Fire Prevention Is Your Job...Too — 1959, 1962, 1964
Fight Fire — 1966
Fire Hurts — 1967, 1968, 1969, 1970, 1971, 1972
Help Stop Fire — 1973
Things That Burn — 1974
Learn Not to Burn — 1975, 1976
Where There's Smoke, There Should Be a Smoke Alarm — 1977
You Are Not Alone! — 1978
Partners in Fire Prevention — 1979, 1980
E.D.I.T.H. — Exit Drills In The Home — 1981
Learn Not To Burn—Wherever You Are — 1982

Chemical Fire Apparatus

(Source: *The Fairchester Hose Haulers Association*)

The first chemical fire apparatus used by the fire department, and a forerunner of the chemical engine, was the "fire extinguisher wagon." This apparatus, equipped with 10 hand extinguishers, was commissioned by the Boston Fire Department in 1871 and designated as Extinguisher Co. No. 1. In 1872, two more of the fire extinguisher wagons, each carrying 25 extinguishers, were put into service in Boston.

Research shows that the Babcock Manufacturing Co., of Chicago was the first American builder of wheeled chemical engines for fire department service. These engines were of the upright stationary-tank type. The acid was mixed in the solution by inverting a lead container. A hand pump was provided for refilling the chemical cylinders from water sources. These chemical units were delivered to the Chicago Fire Department in 1872. In 1873, Charles T. Holloway of Baltimore introduced the first wheeled chemical engine to the Boston Fire Department. Boston also purchased one of the Babcock engines and before long Boston owned 12 chemical engines.

Chemical apparatus came into use when most fires were fought with streams from 2-½-inch hose lines on hand- or steam-operated apparatus. Few communities, however, had adequate water mains. So at first it was thought that all hand and steam fire engines could be replaced with chemical engines carrying 100 to 200 gallons of water. When the water was mixed with "magic" chemicals and projected through a 1-inch hose, these engines could extinguish any fire using a 2-½-inch hose stream.

But chemical engines were overrated and soon their limitations were realized. They became "first-aid apparatus" instead. Chemical engines were of the double upright-tank type, with a third tank carrying reserve water supply. The 1-inch hose was on a reel under the driver's seat. The chemical engine companies also had a second piece of apparatus called a "water tender." These apparatus could charge alternately the tanks and by refilling its supply from hydrants, steamers, or hand pump could keep operations going almost indefinitely.

Combination Apparatus

(Source: The late Clarence E. Meek, F.D.N.Y. Librarian with the assistance of Assistant Librarian Fireman Paul F. Stolz, F.D.N.Y. who researched and translated.)

About 1890, hose wagons began to replace hose reels. The hose wagons of Somerville, MA were equipped with a chemical tank, hose reel and three-horse hitch. These apparatus generally carried one 50- or 60-gallon tank or two 35-gallon tanks.

The first automobile apparatus followed the body designs of the combination hose and chemical wagons. In 1913, Charles A. Fox, of Ahrens-Fox, conceived the idea of mounting a small capacity front end pump and water tank on a motor hose wagon, instead of the commonly used chemical tank. He named the water tank and pump assembly "Booster." The original "Booster" apparatus was placed in service by the Cincinnati Fire Department. The idea of putting a small stream of plain water on a fire through a "garden hose" was openly ridiculed by many fire fighters and officers who still thought that "chemicals" had extinguishing qualities not possessed by ordinary water. However, the "Booster" grew rapidly in favor and soon displaced the chemical engines and chemical combinations.

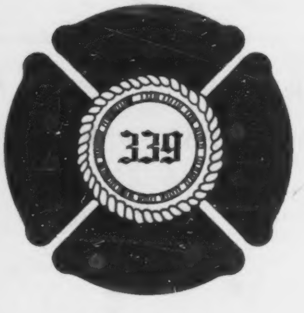
Fire Service Emblems

History of the Maltese Cross

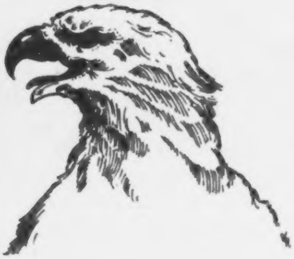
The insignia of the fire service is the Cross Pattee-Nowy, otherwise known as the Maltese Cross. This cross represents the fire service ideals of saving lives and extinguishing fires.

The fire service borrows the emblem of the cross from the Knights of St. John of Jerusalem, a charitable, non-military organization that existed during the 11th and 12th centuries. A white or silver cross on a dark background was adopted by these Knights or Hospitallers, as they were also known, because of their charity toward the sick and poor in setting up hospices and hospitals. Later, they assisted the Knights of the Crusades through their goodwill and also through military assistance in an effort to win back the Holy Land. The Knights of St. John eventually moved to the Island of Malta, the island for which the Maltese Cross was named.

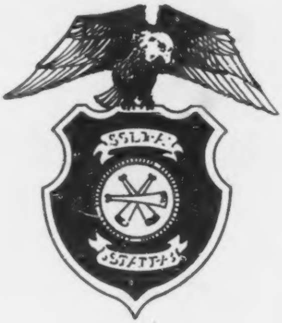
The need for an identifiable emblem for the knights had become crucial. Because of the extensive armor which covered their entire bodies and faces, the knights were unable to distinguish friend from foe in battle. They chose the cross of Calvary as their symbol since they fought their battles for a holy cause. The cross was later called the "Maltese Cross" and represented the principles of charity, loyalty, chivalry, gallantry, generosity to friend and foe, protection of the weak, and dexterity in service.



Maltese Cross



Phoenix



Eagle

During the Crusades, many knights became fire fighters out of necessity. Their enemies had resorted to throwing glass bombs containing naphtha and sailing their war vessels containing naphtha, rosin, sulphur, and flaming oil into the vessels of the knights. Many knights were called to perform heroic deeds by rescuing fellow knights and extinguishing fires. In acknowledgement of these feats, the cross worn by these knights was decorated and inscribed. This was considered a most honorable acclaim.

The Phoenix

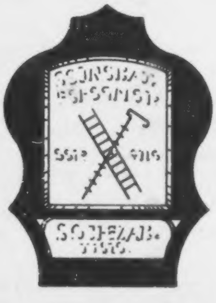
Other emblems of the fire service today can be traced back in history. The Phoenix, a bird nearly equal in size to the Eagle, was symbolic to the early Christians of the resurrection of Christ and of eternal life. Legend tells us that the Phoenix would set a fire and renew its strength and youth, emerging from the ashes as beautiful as ever. The Phoenix can be found on fire hats, flags, badges, and fire department seals.

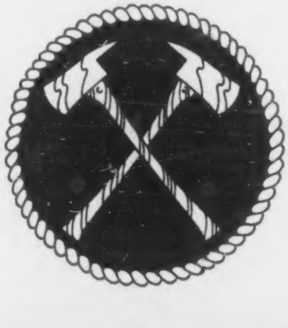
The Eagle

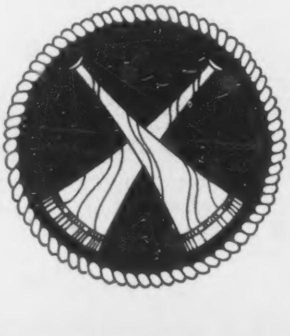
The Eagle, veritably a symbol of courage and majesty, is displayed with extended wings on the crests and shields of high-ranking officers. This symbol signifies that the wearer is a person of authority. The open wings stand for charity and protection; the beak and talons represent enforcement of discipline.

The Badge

The badge of the fire service is in the shape of a shield containing the Maltese Cross on either the crest or the shield. During the Crusades, shields were used by the knights as protective gear to guard against the enemy. In a similar sense, the fire service acts as a shield, a form of protection against the enemy of fire.







A rope or cord, forming an unbroken circle and symbolic of unbroken service and loyalty, can often be found decorating the badge, forming a border. Inside this circle are found various emblems, each representative of a trait, an event, etc. Crossed ladders indicate one who was "extremely brave" in battle. Crossed arms, axes, ladders, etc. in the form of "St. Andrew's Cross" represent one who was "the bravest." Fire chiefs today wear the badge with the cross and crossed speaking trumpets denoting rank; one silver trumpet is a lieutenant; two silver trumpets, a captain; two gold trumpets, crossed, battalion chief. Five crossed trumpets is the Chief Engineer.

Colors

Colors were symbolic during the Crusades as they are to the fire service today. "Blue" represented sincerity and truth as in the "Blue of the Uniform." White or silver stood for peace; red for nobleness; gold or yellow for generosity and elevation; and black for grief.

The colors of the badge, crest and frontpiece of the fire helmet indicate the rank of the fire service—gold and white for a chief; white and black for an officer below rank of chief.

A Fireman's Prayer

(Compliments of Carrington Distillers Limited)

When I am called to duty, God, wherever flames may rage,
Give me strength to save some life, whatever be its age.
Help me embrace a little child before it is too late,
Or save an older person from the horror of that fate.
Enable me to be alert and hear the weakest shout,
And quickly and efficiently to put the fire out.
I want to fill my calling and to give the best in me,
To guard my every neighbour and protect his property.
And if, according to my fate, I am to lose my life,
Please bless with Your protecting hand my children and my wife.

Fire Museums

United States

Alabama
Museums of the City of Mobile
Mobile

The Phoenix Fire Museum
203 S. Clairborne St.
Mobile

Arizona
Hall of Flame
6101 E. Van Buren
Phoenix

Hall of Flame
National Historical Fire Foundation
Scottsdale

California
Knott's Berry Farm
Buena Park

State Park
Columbia

Old Plaza Fire House
Los Angeles

Travel Town
Griffith Park
Los Angeles

Sutter Museum
Sacramento

The Firehouse Museum
1572 Columbia St.
San Diego

San Diego Historical Society Museum
P.O. Box 10571
San Diego

Firemen's Fund Insurance Co.
San Francisco

San Francisco Fire Dept.
Pioneer Memorial Museum
655 Presidio Ave.
San Francisco

Pioneer Museum and Haggin Galleries
Pershing Ave. & Rose St.
Stockton

Colorado

Alma Firehouse Museum
Alma

Denver Firefighters Museum
1326 Fremont Place
Denver

Connecticut

Connecticut Fire Museum
Rte. 140, Bridge St.
Warehouse Point

Delaware

Delaware State Museum
Dover

Washington, DC

District of Columbia Fire Safety Education Center & Museum
438 Massachusetts Ave., NW

The Friendship Fire Association Museum
4930 Connecticut Ave., NW

Smithsonian Institution

Florida

The Carriage Cavalcade
Silver Springs

Jacksonville Fire Department Museum
12 Catherine St.
Jacksonville

O'Meara Historical Collection of the American Fireman
Hialeah, FL
Hialeah Fire Engine Museum
Hialeah, FL
O'Meara's Fire Engines of Yesterday
Blowing Rock, NC
c/o Mr. Vincent H. O'Meara
974 E. 23rd St.
Hialeah

Illinois

Aurora Fire Museum
Michel St.
Aurora

Chicago Historical Society Museum
North Ave. & Clyde St.
Chicago

Museum of Science and Industry
Chicago

National Historical Fire Foundation
400 N. Michigan Ave., Suite 711
Chicago

Indiana

The Firefighting Gallery of Indianapolis
30th & Meridian
Indianapolis

Louisiana

Louisiana State Museum
New Orleans

Presbytere Museum
751 Chartres St.
New Orleans

Maine

Portland Veteran Fireman's Association
Portland

Lincoln County Fire Museum
Federal St.
Wiscasset

Maryland

Baltimore City Fire Museum
Gay & Ensor Sts.
Baltimore

Baltimore Fireman's Museum
423 N. Gay St.
Baltimore

Fire Museum of Maryland
Heaver Plaza
Baltimore

Fire Museum of Maryland
1301 York Rd.
Lutherville

Museum of the Baltimore Equitable Society
Baltimore

Museum of the Box 414 Association, Inc.
Baltimore

Salisbury Fire Department Museum
143 S. Division St.
Salisbury

Massachusetts

Boston Museum of Transportation
300 Congress St.
Boston

New England Fire and History Museum
Route 6A
Brewster

Antique Auto Museum
15 Newton St.
Brookline

National Fire Museum
21 Endicott St.
Newton Highlands

Society for the Preservation of New England Antiquities
Norwell

Berkshire Museum
Pittsfield

Essex Institute
Salem

Edaville Railroad and Museum
South Carver

Old Sturbridge Village
Sturbridge

The Atlantic Museum
1 Burrill St.
Swampscott

Townsend Fire Department Museum
Townsend

New England Fire Truck Museum
P.O. Box 471, Rte. 6
Wareham
(Owned by Chief Everett Booker, Retired)

Michigan

Henry Ford Museum & Greenfield Village
Dearborn

Poll Museum
U.S. 31 at New Holland St.
Holland

Kalamazoo Public Museum
Kalamazoo

Minnesota

Austin Firefighting Museum
Austin

Lumbertown USA
Brainerd

Hinckley Fire Museum
Hinckley

Missouri

The Missouri Historical Society/Jefferson Memorial
Forest Park
St. Louis

Montana

Yellowstone County Museum
Municipal Airport
Billings

Nebraska

Harold Warp's Pioneer Village
Minden

Nevada

Nevada State Museum
Carson City

Last Frontier Village
Las Vegas

New Hampshire

Manchester Historic Association
Manchester

New Jersey

New Jersey Firemen's Home
565 Lathrop Ave.
Boonton

Newark Fire Museum
49 Washington St.
Newark

James E. Lesnick Fire Museum
217 Willow Ave.
Piscataway

Meredith Havens Fire Museum
244 Perry St.
Trenton

New Jersey Fire Museum
177 Valley St.
South Orange

New York

New York State Museum
Cultural Education Center of the Empire State Plaza
Albany

Long Island Old Fire Engine Collection
Baldwin

Brooklyn Public Library
Brooklyn

Signal 7-7 Museum
326 Livington St.
Brooklyn

Ye Olde Fire Station Museum
8862 Cicero-Brewster Rd.
Cicero

American Museum of Firefighting
Firemen's Home
Hudson

Smith's Cove
Old Museum Village
Monroe

Firefighting Museum of the Home Insurance Co.
59 Maiden Lane
New York

Museum of the City of New York
8th Ave. & 103rd St.
New York

Museum of the City of New York
1220 Fifth Ave.
New York

New York City Fire Museum
104 Duane St.
New York

Long Island Automotive Museum
Southampton

Jefferson County Historical Society Museum
228 Washington St.
Watertown

North Carolina

The New Bern Firemen's Museum
Central Fire Station
New Bern

Ohio

Cincinnati Fire Department Museum
315 West Court St.
Cincinnati

Nationwide Insurance Display
North High St. & Nationwide Blvd.
Columbus

Ohio State Museum
Columbus

Allen County Historical Museum
Lima

Oklahoma

Varnes Fire Museum
8168 S. Bedford Rd.
Macedonia

Oklahoma State Firefighter's Museum
2716 NE 50th St.
Oklahoma City

Oregon

Jacksonville Museum
Jacksonville

Pennsylvania

Old Economy Museum (Harmony Society)
Ambridge

Lincoln Fire Station
Bethlehem

Chambersburg Volunteer Firemen's Museum
441 Broad St.
Chambersburg

Buda County Historical Society
Doylestown

Doylestown Museum of Historical Vehicles
Doylestown

Firefighters Historical Museum, Inc.
West Fifth and Chestnut Sts.
Erie

Hershey Museum
Hershey

Atwater Kent Museum
Philadelphia

Fireman's Hall
2nd & Quarry Sts.
Philadelphia

INA Corporation Collection
Philadelphia

The Franklin Institute
Philadelphia

Insurance Company of North America
1800 Arch St.
Philadelphia

Philadelphia Fire Department Museum
149 North 2nd St.
Philadelphia

The York County Fire Museum
West Market and Carlisle Ave.
York

Rhode Island

Jamestown Fire Department Memorial Museum
Jamestown

South Carolina

Charleston Museum
Charleston

Tennessee

Memphis Fire Department Museum
2 Avery St.
Memphis

Texas

Dallas Firefighters Museum
3801 Parry
Dallas

Fire Museum of Texas
702 E. Safari Parkway
Grand Prairie

San Antonio Museum Association
San Antonio

Utah

Shelburne Museum
Shelburne

Virginia

Friendship Fire Engine Company Museum
107 S. Alfred St.
Alexandria

Steamer Company No. 5 Museum
200 W. Marshall St.
Richmond

Washington

Gamon Museum & Wagons
Mabton

Washington State Fire Service Historical Museum, Inc.
16231 - 11th Ave., NE
Seattle

Wisconsin

Hall of Flame
Highways 31 and 43
Kenosha

Milwaukee County Historical Society
Milwaukee

Peshtigo Fire Museum of Northern Wisconsin
400 Oconto Ave.
Peshtigo

Fire House No. 3 Museum
6th St. & Grand Ave.
Racine

Canada

Montreal Auxiliary Firemen Museum
St. Laurence Blvd. & Laurier Ave.
Montreal

Chateau de Ramssay
Montreal, P.Q.

Western Development Museum
Moose Jaw, Saskatchewan

Firefighters Museum of Nova Scotia
Nova Scotia

Toronto Fire Department Museum
Eastern Ave.
Toronto

Firefighters' Museum of Nova Scotia
Yarmouth, N.S.

Europe

Austria

Burgenlandisches Feuerwehrmuseum
Landes-Feuerwehr-Schule
Leithabergstrasse 41
A-7000 Eisenstadt

Feuerwehr-Museum
FF Laxenburg (VFD)
A-Laxenburg

Museum der Fa. Rosenbauer
Paschinger Strasse 90
A-4021 Leonding (Linz)

Niederosterreichisches Feuerwehrmuseum
Landes-Feuerwehr-Schule
Nassallee 4
A-3430 Tulln

Wiener Feuerwehrmuseum
Vienna F.D., HQ-Station
Am Hof 7
A-1010 Wien

England
The Yorkshire Fire Museum
Bradford Rd.
Batley, West Yorkshire

West Germany
Feuerwehr-Museum Dietzenbach
Schiller-Str. 30A
D-6057 Dietzenbach

Deutsches Feuerwehr-Museum
An St. Florian 4
D-6400 Fulda

Feuerwehr-Museum
Feste Oberhaus
D-8390 Passau

Feuerwehr-Museum Salem
Salem Monastery
D-7777 Salem

Feuerwehr-Museum Schwabisch-Hall
Neue Str. 26
D-7170 Schwabisch-Hall

Feuerwehr-Museum Waldmannshofen
Agnes-Schreiber-Str. 15
D-6990 Bad Mergentheim

Feuerwehr-Museum Winnenden
Mark Str. 11
D-7057 Winnenden

Fire Buff Clubs

Buff. A fire department enthusiast. (See also fire fan, "go-fer," ringer, spark, sparky.)

Thus reads the "buff" entry in the book *Fire Terms* published by the National Fire Protection Association. Pursuing the reference words, under "fire fan" is the definition "an individual interested in fires and fire fighting." A "go-fer" is a fire buff, volunteer helper, or probie who runs errands for fire fighters. (Here's still another term, "probie," meaning "a probationer — a fire fighter recruit undergoing a period of training which must be satisfactorily completed in order to receive permanent appointment.") A "ringer" is a person who pretends to be a fire fighter, and/or a fire fan or buff who likes assisting fire fighters. And finally, a sparky, spark, or sparkle is an individual interested in fire and the fire service.

Fire buff clubs are made up of individuals with any or all of these special interests in fires, fire fighting, the fire service, fire apparatus (antique and modern), and volunteer assistance to fire fighters and fire departments. Activities of buff clubs range from restoring antique fire apparatus, organizing musters, and managing fire museums to providing canteen service at the scene of multiple alarm fires. Some buff clubs research and publish fire department histories, give awards to fire fighters, operate mutual aid fire communications systems, help in fire department public relations efforts, and do fire prevention and public education work in the community. Most clubs meet regularly for programs related to their varied interests.

Over 70 fire buff and fire service groups in the U.S. and Canada are members of the International Fire Buff Associates, Inc., with executive offices at 7509 Chesapeake Ave., Baltimore, MD 21210. Organized fire buff and fire service groups who are interested in affiliation with the International Association should write the Executive Office for information and a sample copy of their *Code for Fire Buffing.* The following list of fire buff clubs is from the 1982 edition of the *Visiting Fireman.*

United States

Arizona

2-11 Association of Phoenix Fire Buffs, Inc.
P.O. Box 9683
Phoenix
(602) 992-0826
Pres. Stuart Logan
Sec'y James Grubb

6-6 Fire Buffs of Arizona, Inc.
1903 W. Holly St.
Phoenix
(602) 256-0341
Pres. Dave Branch
Sec'y Bob Hatter

Southern Arizona Fire Buff's Association
3521 N. Flowing Wells Rd., Apt. 6
Tucson
Pres. Thomas A. Birch
V. Pres. Darren Cummings

California

The Box 15 Club of Los Angeles
P.O. Box 54158
Los Angeles
(213) 589-9592
Pres. Peter Balducci
Sec'y Janice Bass

Sacramento Fire Buff Club
P.O. Box 13862-A
Sacramento

Fire Associates of Santa Clara Valley
6494 Mojave Dr.
San Jose
(408) 736-1566
Pres. Leonard Williams
Sec'y Stan Kelso

Ahrens-Fox Fire Buffs' Association
600 E. Weddell Dr., Sp. 59
Sunnyvale
(408) 734-1074
Pres. Ed Hass

Colorado

Fellowship of Christian Firefighters International
P.O. Box 9324
Denver
(303) 841-4495
Pres. Duncan Wilkie

Connecticut

Connecticut Fire Photographer's Association
Sec'y-Treas. Alan Chaniewki
1012 Old Colony Rd.
Meriden or
State of Connecticut Fire Commission
294 Colony St.
Meriden
(203) 237-5642
Pres. Glenn Vincent

Box 22 Associates
424 Elm St.
New Haven
(203) 865-1234
Pres. Richard Gelinas
Sec'y William C. Celentano, Jr.

Connecticut Cellar Savers, Inc.
P.O. Box 553
Oxford
(203) 888-9332
Pres. Frederick J. Pommer
Sec'y Frances R. Pommer

Washington, DC

Friendship Fire Association
4930 Connecticut Ave., NW
Pres. Bruce Paquette
V. Pres. Bill Blackwood
Sec'y Walter Ellis

Florida

Fire Service in Philately
P.O. Box 3011
Rotunda West
(813) 474-7321
Pres. Gustave Knoeckel
Sec'y Glenn Hartley

WE WANT TO KNOW . . .
if a name, an address, or a phone number has changed; if there's an upcoming event, a new program or course, a new publication being offered. If you have more current information than is contained in this *Almanac*, know something that should be included in this book, or just have something interesting about the fire protection scene that you want to contribute, please let us know. Write: Editor, *Fire Almanac*, NFPA, Batterymarch Park, Quincy, MA 02269. All suggestions will receive our careful attention.

Florida Antique Bucket Brigade
1514 West Palm Circle
Valrico
(813) 685-6110
Pres. Jim Briggs
Sec'y Sue Czaplicki

Georgia

Metropolitan Fire Associates of Atlanta, Georgia
Box 306
Avondale Estates
Atlanta
(404) 378-7601
Foreman Paul T. Talbott
Sec'y Dave E. Williams

The Fire Mark Circle of the Americas
2859 Marlin Dr.
Chamblee
(404) 451-2651
Pres. Henry A. Kroll
Sec'y Glenn Hartley, Sr.

Hawaii

Hawaii Fire Buffs Association
Sec'y Dennis Lewis
98-227 Kanuku St.
Aiea
Paul Fox (808) 553-2536
Pres. Charles "Doc" Kinney
V. Pres. Robert Van Dusen

Illinois

Fire Buffs of Illinois
5420 S. Kedvale Ave.
Chicago
(312) 585-1301
Pres. Jack Connors
Sec'y Dennis Adamski

5-11 Club, Inc.
P.O Box 8511
Chicago
(312) 867-6114
Pres. Ken Falk
Sec'y Nancy Quinn

Smokey Row Hose Company No. 1
107 N. Prairie
Dwight
(815) 584-2083
Chiefs:
  Alex McWilliams
  Jay Erickson
  Margo Erickson
  Tom Laun
  Dianne Clement
  S. "Boots" Riccolo

Chicago Fire Fans Association
404 N. Roy Ave.
Northlake
(312) 562-8619
Pres. Hyman Levine
Sec'y William F. Scharlau

10-87 Club of Greater Rockford
P.O. Box 1087
Rockford
(815) 398-5233 or
(815) 226-1837
Pres. James J. Olesen
Sec'y Cindy Maschke

Indiana

Indianapolis Fire Buffs
5141 S. Madison Ave.
Indianapolis
(317) 283-6672
Pres. R. Michael "Mike" Baer
Sec'y William R. Zimmer

Metropolitan Fire Associates
712 St. Joseph Bank Building
South Bend
Pres. William Carlson (219) 232-6168

Louisiana

Signal "51" Group
830 Erie St.
Shreveport
(318) 865-5783
Pres. Norman Zaffater
Sec'y Harvey L. Carter, MD

Maryland

Box 414 Association, Inc.
824 Fifth Ave.
Baltimore
(301) 242-0743
Pres. Charles A. Ashley, Jr.
Sec'y Charles C. Price

International Fire Buff Associates, Inc.
c/o Roman A. Kaminski, Exec. V. Pres.
7509 Chesapeake Ave.
Baltimore
(301) 477-1544
Pres. Theodore G. "Ted" Main
Sec'y Keith F. Franz

Ladies' Auxiliary of Box 414 Association, Inc.
7509 Chesapeake Ave.
Baltimore
(301) 477-1544
Pres. Mrs. Roman A. Kaminski (Gertrude)
Sec'y Mrs. Julian Katzenberg (Margie)

Pompier Club
815 Stoneleigh Rd.
Baltimore
(301) 377-8212
Pres. Norman C. Keyes, Jr.
Sec'y Charles H. Briggs

S.H.C. Association
632 N. Fremont Ave.
Baltimore
(523) 728-8994
Pres. Delmar E. Davis
Sec'y Arthur P. Hardy

Massachusetts

Fire District No. 2 Antique Fire Apparatus Club
845 Main St.
Box 124
Agawam
(413) 768-8746
Pres. Raymond K. Pond
Sec'y James Taylor

Boston Sparks Association, Inc.
99 W. Fourth St.
Boston
(617) 269-9700 (evenings)
Pres. Robert J. Melinn
Sec'y Richard N. Bangs

Box 52 Association, Inc.
17 Linden St.
Everett
(617) 387-1036
Pres. Robert A. Doyle
Sec'y Richard W. Somerville

Essex County Fire Wardens' Association
162 County Rd.
Ipswich
Pres. William Carter
Sec'y Norman Stone

New England States Veterans Firemen's League
16 S. Pond St.
Newburyport
(617) 465-3948
Pres. Fritz Hilbert
Sec'y Stan Dixon

Massachusetts Antique Fire Apparatus Association
P.O. Box 3332
Peabody
(617) 352-8117
Pres. James F. Dillion
Sec'y Sandy Angus

Tapper Club of Boston, Inc.
P.O. Box 388
Weymouth
Pres. Elbert Enos
Sec'y Frank J. San Severino

Michigan

Greenfield Village International Antique Fire Apparatus Association
Greenfield Village, Dept. SE
Dearborn

Box 42 Associates
P.O. Box 42
Detroit
(313) 821-0061
Pres. Anthony Isaac
Sec'y Ted Main

Detroit Fire Buffs Association
5752 Courville Rd.
Detroit
(313) 855-6725
Sec'y to Board of Governors Joseph M. Burch

321 Association, Inc.
38 LaGrave Ave., SE
Grand Rapids
(616) 453-6638
Pres. Robert Van Campen
Sec'y Dennis Morrow

Box 12 Associates
1227 Workshire
Grosse Pointe
(313) 882-1039
Pres. Mark Beltaire
Sec'y Martin Barahl (313) 566-0700

Minnesota

Extra Alarm Association of the Twin Cities
1801 W. 59th St.
Minneapolis
(612) 571-7370
Pres. Ralph Messer
Corr. Sec'y Steve Skaar

Missouri

Box 8 Club of St. Louis
P.O. Box 1521
St. Louis
(314) 776-6748 or (314) 781-2201
Pres. Jan C. Faulstich
Sec'y Robert E. Reising

New Jersey

Greater Essex Fire Brigade, Inc.
11 Orchard St.
Bloomfield
(201) 748-4658
Pres. Robert L. Kane
Sec'y G. Grant Miller

Gong Club, Inc.
P.O. Box 213
Jersey City
(201) 333-9147
Pres. Frank Bohrman
Sec'y Ron Jeffers

Bell and Siren Club
44 Mount Prospect Ave.
Newark
(N.F.D. Rescue No. 1)
(201) 226-3280
Sec'y Ira Cohen

South Jersey Fire Buffs Association, Inc.
2419 42nd St.
Pennsauken
(609) 665-6464
Pres. Robert C. Bartosz
Sec'y W. Earle Doan

Box 54 Club
P.O. Box 54
Teaneck
(201) 836-7125
Pres. Edward Black
Sec'y George Miros

Signal 22 Association, Inc.
1100 Brunswick Ave.
Trenton
(609) 587-0077
Pres. Irving Charlip
Sec'y Howard M. West III

Fire Apparatus Model Builders Association
P.O. Box 749
Union City
(609) 882-8502
Pres. Ken Kandrac
Sec'y Ron Jeffers

Glasstown Antique Fire Brigade
49 N. Myrtle St.
Vineland
Pres. James Mulch
Sec'y Nancy Howe

New York

The Brockport Fire Department S.T.E.A.M.E.R.S.
38 Market St.
Brockport
Fire Chief Norman J. Knapp (716) 637-2512
Pres. Gary Demler (716) 637-6974

The Grey Ghost Exempt Association
237 S. Main St.
Brockport
Norman J. Knapp (716) 637-2512
Scott Warthman (716) 637-6896

New York Firemen's Cycle Club
95 W. 195 St.
Bronx
(212) 543-5982
Pres. Dr. J.W. Goldenkrantz
Sec'y Dr. A.S. Birnbaum

Citywide Disaster Services, Inc.
P.O. Box 208
Brooklyn
(212) 377-5161
Directors:
Arthur E. Kaye
Glen Konwaler
Keith Brooks

Signal Seven-Seven Fire Club
486 14th St.
Brooklyn
(212) 768-9479
Pres. John G. Dwyer
Sec'y Robert Carpenter

Fire Bell Club of Buffalo, Inc.
700 Niagara Frontier Blvd.
Buffalo
Pres. John W. Bisantz
V. Pres. Donald W. Holland
Sec'y-Tres. James T. Duggan

Staff Chiefs Association-New York Fire Dept.
28-02 Marinette St.
Douglaston
(212) 225-5711
Pres. retired Asst. Chief Francis J. Love
Sec'y-Tres. retired Asst. Chief Charles J. Stressler

Fire Bell Club of New York
Suite 58, Hotel New York Statler
7th Ave. at 33rd St.
New York
(212) PE6-5000, Ext. 6269
Pres. Frank Donnelly (212) 332-9903
V. Pres. Jack Lerch (212) 888-5209 (office) or (212) 796-2886 (residence)
Sec'y Bill Ladell (212) 965-8377
Treas. Frank Daly (212) 678-3136

Third Alarm Association
150 Amsterdam Ave.
New York
Pres. H. Wegner
Sec'y E. Leonard

Long Island Fire Photographers Association
456 48th St.
N. Lindenhurst
(516) 967-1175
Pres. Bill Meyer
Sec'y Lenny Kostas

Fairchester Hose Haulers Association, Inc.
P.O. Box 6
Pelham
(914) 738-1289
Pres. G. Marshall Sanford
Exec. Sec'y Warren P. Lyon

Box 333 Association
1102-3rd St.
Rensselaer
Pres. Michael F. Mann
Sec'y Philip B. Smith

Naer Tormid Society of the Fire Dept. of the City of New York
835 Willowbrook Rd.
Staten Island
(212) 761-1937
Pres. Raymond Simms
Sec'y Stephen L. Klein

Signal 88 Fire Buff Club, Inc.
P.O. Box 91
Staten Island
(212) 981-8972
Pres. Fred J. O'Neill
Sec'y Charles (Chip) McLean

Society for the Preservation and Appreciation of Antique Fire Apparatus in America
P.O. Box 450
Eastwood Station
Syracuse
Pres. Frank Tremel
Sec'y Marvin Cohen

The Box 17 Club
75 Eagle St.
Troy
(518) 272-8892
Pres. Raymond Henry

The New York State Association of Fire Chaplains, Inc.
1644 Genesee St.
Utica
(315) 733-4661
Pres. Rev. Alan Carvalho
Sec'y Alan Peabody

Ohio

Box 13 Associates
3103 Manning Ave.
Cincinnati
(513) 242-3733 (Pat Holz)
Pres. David T. Sheehy
Sec'y David F. Berry

Extra Alarm Fire Association, Inc.
6606 Buckingham Pl.
Cincinnati
(513) 271-6175
Pres. George F. Ross
Sec'y Ronald N. Hill

Western Reserve Fire Buffs Association
P.O. Box 5013
Cleveland
(216) 521-2198
Pres. Bill Varnes
Sec'y John McCown

Box 15 Club, Inc.
1296 Carbone Dr.
Columbus
(614) 267-9594
Pres. Larry Parlett
Sec'y Charlie Pickard

Miles Greenwood Historical Fire Apparatus Society
605 Garfield
Milford
(513) 831-6398
Pres. Howard Kuhnell
Sec'y Steve Hagy

Oklahoma

Tulsa Fire Buff Association
8945 E. 58 St.
Tulsa
(918) 252-5241
Pres. Chuck Bigbie
Sec'y Pete Byrne

Pennsylvania

Second Alarmers Association of Philadelphia, Inc.
2900 Roberts Ave.
Philadelphia
(215) 745-4272
Pres. John C. Lewis
Sec'y George R. White

Rhode Island

Special Signal Fire Association
Box 454 - Annex
Providence
(401) 434-6358
Pres. Norman E. Gladding
Sec'y Noel N. Kerkhoff

Tennessee

Music City Pompier Club
6845 Pennywell Dr.
Nashville
Pres. Bill Ketchum

Texas

Box 4 Fire Buff Association
P.O. Box 2917
Dallas
(214) 528-6556
Pres. Bill Rucker
Sec'y Carl Reynolds

Virginia

National Society of Firemen's Parade Watchers and Fire Apparatus Picture Takers of America
4101 Woodland Dr.
Fairfax
(703) 273-0051
Chairman Len Sasher

Washington

Last Resort Fire Dept. (Northwest Antique Fire Apparatus Association, Inc.)
1433 NW 51st St.
Seattle
(206) 783-4474
Pres. Earle L. Kahler
Sec'y Galen K. Thomaier

Seattle Fire Buff Society, Inc.
301 Second Ave., S.
Seattle
(206) 363-4203
Pres. Lew Brandenstein
Sec'y Robert W. Pitzer

Wisconsin

Badger State Fire Buffs
9775 W. Keefe
Milwaukee
(414) 463-5537 (Mark Hoeller)

Milwaukee Fire Bell Club, Inc.
5544 South Monaco Place
Hales Corners
(414) 342-7810
Pres. James Albanese
Sec'y Keith Franz

Racine Fire Bell Club, Inc.
P.O. Box 1042 or 700 6th St.
Racine
(414) 633-4305
Pres. Sy Helding
Sec'y Wilbur Tangerstrom

Canada

Box 43 Association
P.O. Box 506
10 John St. S.
Hamilton, Ontario 18N 3H8
(1-416) 335-2276
Pres. Gerry Hourigan
Sec'y Dave Lumsden

Ontario Fire Buff Associates, Inc.
P.O. Box 802
Station "Q"
Toronto, Ontario M4T 2N7
Pres. Gary J. Wignall
Sec'y Norman Weddum

Netherlands

Nederlandse Vereniging "De Brandweerhobbyist"
Postbus 813, 1200 AV Hilversum
Sec'y M. Siebelt
Eikbosserweg 71
1214 AG Hilversum

Additional Fire Buff Associates, Inc. Active Member Groups as of Feb. 24, 1982

California

Peninsula Fire Buff Club
Redwood City

Pioneer Hook and Ladder Co.
San Diego

Phoenix Society of San Francisco
San Francisco

Florida

Greater Miami Code One Association, The
Coral Gables

Central Florida Fire Buffs Association
Orlando

Illinois

Moline Second Alarmers Association
Moline

Kansas

Wichita - Sedgwick Fire Service
Wichita

Louisiana

Firefighting Historical Association, The
Metairie

Maine

Box 61 Club, Inc. - Portland Fire Buffs
Portland

Maryland

Central Alarmers, Inc.
Baltimore

Anne Arundel Alarmers Association, The
Glen Burnie

Box 234 Association, Inc.
Pikesville

Massachusetts

Essex County Fire Wardens' Association
Lynnfield

Worcester West Forest Wardens' Association
Phillipston

Middlesex County Firefighters & Fire Wardens' Association
Winchester

New Jersey

Atlantic City Fire Reserve
Atlantic City

South Orange Volunteers
South Orange

New York

Signal Six-Six Fire Buff Club of New York City, Inc.
New York

Ohio

Central Ohio Fire Buffs Association
Columbus

Oklahoma

Box 3432 Fire Buff Club
Oklahoma City

Pennsylvania

Delaware Valley Fire Buffs Associates, Inc.
Philadelphia

Rhode Island

Special Signal Fire Association
Warwick

Texas

Fort Worth Red Helmets
Fort Worth

America '76 Hose Company
Houston

Wisconsin

Brookfield Fire Associates, Inc.
Brookfield

Canada

Metropolitan Toronto Multiple Alarm Association
Islington, Ontario

The early American colony at Plimouth (Plymouth), Massachusetts was settled in 1620. Three years later, a fire swept through the town, destroying nearly all the provisions and at least seven dwellings.

Fire Service Trivia

Fire Firsts

The first fire recorded on the island that was to become Manhattan occurred in 1628 when a dwelling caught fire and burned to the ground. Subsequently, during the reign of Governor Peter Stuyvesant, the first fire prevention and building code was established. Among other things, it allowed for creation of a committee to inspect all chimneys in Nieuw Amsterdam with the privilege of fining owners who did not keep chimneys swept clean. Stuyvesant also began a form of municipal fire protection, purchasing buckets for use during fires and establishing a fire warning system that featured selected individuals as fire watchers. These persons carried wooden rattles that made noise loud enough to rally nearby citizens for fire fighting.

(Kenneth Dunshee, *As You Pass By*)

In 1808, the first working hydrant was installed in New York City, attached to an underground wooden water main.

The first fire insurance office was established in England in 1667, one year after the Great Fire of London.

In 1736, Benjamin Franklin and several other prominent Philadelphians established the first organized fire brigade in America, which continued as the Union Fire Company for over 80 years.

In 1852, a patent was issued for the first sprinkler perforated pipe system designed by James Pichen Francis, proprietor of Locks and Canals at the Merrimac River in Lowell, Massachusetts. This probably was the first recognized installation of fixed fire protection equipment, but the full, expansive development of sprinkler systems did not really get under way for another 20 years.

In 1752, the first American fire insurance company was formed, under the inspiration of Benjamin Franklin of Philadelphia. This was the Philadelphia Contributionship for the Insurance of Houses from Loss by Fire. In 1792, the Insurance Company of North America was formed — the first American fire and marine insurance company. Other insurance companies sprang up, but contrary to the English custom, these companies did not maintain fire brigades of their own, but relied on the volunteer fire companies already flourishing.

The Los Angeles City Fire Department first organized a volunteer unit in 1871. It purchased an Amoskeag pumper and a hose cart, which were drawn by hand. The pumper was shipped from Massachusetts to San Francisco by rail, then had to be transported to Los Angeles in wagons drawn by mules. In 1874, when the volunteer engine company asked the city council to purchase horses to pull this heavy apparatus, the request was denied and the company disbanded.

(History of the Los Angeles Fire Department)

Arson Trivia

Arson was a serious and frequent problem in the early days of America, as indicated by this portion of law passed by the General Court of Massachusetts in 1652: "Enacted by the Authority of this Court that any person or persons whatsoever of the age of Sixteen years and upward, that shall after the publication hereof wittingly and willingly set fire any Barn, Stable, Mill, Out House, Stack of Wood, Corn or Hay, or any other thing of like nature, shall upon due conviction by testimony or confession, pay double damage to the party damnified, and be severely whipt.

The first American law relating to arson was enacted in Maryland in 1638, in the Session of the General Assembly. It decreed: "Malicious trespasses as to burn or destroy willfully a house or stack or corn or tobacco" as a felony. Penalties required the offender to "suffer the pain of death by hanging"; however, a less severe penalty was permitted: the offender could "lose his hand or be burned in the hand or forehead with a hot iron and shall forfeit all his land." A second offense required the death penalty.

Fire Service Trivia

In the 19th century, the location of a fire in New York City was indicated to fire fighters by a crimson ball or lantern suspended from the cupola of City Hall. The position of the ball to the cupola indicated the direction of the fire. At the same time, a heavy alarm bell was rung whose strokes pounded out the ward in which the fire was located. This auditory alarm was relayed throughout the city by church bells. One night, fires were discovered in separate locations. The lantern was shifted from one direction to another, with the result that the firemen raced about in circles while the flames raged unchecked. Finally, messengers were sent out to direct them, but not until fears had been raised for the safety of the entire city.

In 1774, George Washington was a member of the Friendship Fire Company in Alexandria, Virginia.

Throughout the history of the United States, but especially in the 18th and 19th centuries, most political and military leaders were members of volunteer fire departments at some time. George Washington, Thomas Jefferson, Alexander Hamilton, John Jay, Benedict Arnold and hundreds of other famous persons in history served as volunteer fire fighters.

Famous Fires Trivia

In a 1653 conflagration in Boston, Massachusetts, buildings exploded one after another as the fire involved gunpowder in each dwelling. The colonists used gunpowder for their muskets, as well as for blasting operations on their farms, so it was common practice to store barrels of this explosive in a convenient place in the building.

The "Great Fire of 1835" in New York City destroyed nearly the entire business portion of the city — about 13 acres and 700 buildings. Loss was estimated at 20 to 40 million dollars, a mammoth sum in those days.

In 1849, St. Louis, Missouri, suffered an epidemic of cholera, which arrived with the boatloads of immigrants and gold-seekers heading for California. When the epidemic was at its height, the "Great Fire" of May 17 occurred along the Missouri River, destroying 23 steamboats and 400 buildings in 15 city blocks, with losses estimated at more than $5 million.

In 1775, British ships sailed into Falmouth (now Portland), Maine, to burn that community to the ground as punishment for aggressive actions of the colonists. The fleet bombarded and burned 139 houses, 278 stores, and other buildings, but the people of Falmouth stayed in their town and eventually repulsed the enemy.

(Lossing's *Field Book of the Revolution*)

Jamestown, Virginia, the first American Colony to be settled (in 1606, under Captain John Smith) had a devastating fire in 1608 that destroyed most of the colonists' lodgings and provisions.

(David Lovejoy, *The Glorious Revolution in America*)

Reference

1983-84 Calendar of Events

Spring 1983. Public Education Seminar, Salina, KS. For further information contact: Captain Rodney Bachofer, Salina Fire Dept., 222 W. Elm St., Salina, KS 67401. (913) 827-0411.

March-Fall, 1983. Waterous Mobile Demonstrator Classes, to be scheduled in the midwestern and southern states. For further information contact: Dan Juntune, Sales Representative, Waterous Company, 300 John E. Carroll Ave., E South St. Paul, MN 55075. (612) 450-5070.

March 10-12, 1983. National Association of Fire Equipment Distributors Sectional Conference, San Diego, CA. For further information contact: NAFED, 111 E. Wacker Dr., Chicago, IL 60601.

March 14-17, 1983. Fire Department Instructors Conference. For further information contact: ISFSI, 20 Main St., Ashland, MA 01721. (617) 881-5800.

March 20-23, 1983. Fire Retardant Chemicals Association, Baltimore, MD. For further information contact: FRCA, 265 Post Rd. W, P.O. Box 913, Westport, CT 06881. (203) 226-9029.

March 31-April 1, 1983. Fire Chief's Meeting, Tulsa, OK. For further information contact: Executive Director Robert Hollander, Oklahoma State Fire Chiefs Association, P.O. Box 15507, Oklahoma City, OK 73136. (405) 624-1452.

April 6-8, 1983. NFPA Standards Council Meeting, Washington, DC. For further information contact: Leona Taraskiewicz, National Fire Protection Association, Batterymarch Park, Quincy, MA 02269. (617) 328-9290.

April 9-13, 1983. London, England. LIFE '84 (London International Fire Exhibition). Sponsored by the Council of British Fire Protection Equipment Manufacturers. For further information contact: Ken W. Barnes, Victor Green Publications Ltd., 106 Hampstead Rd., London NW1 2LS, England. Telephone 01 388-7661, Telex 8811108.

April 11-15, 1983. Advanced Public Fire Educator School. Oregon Fire Education Association. For further information contact: Nancy Kornegay, Hillsboro Fire Dept., 148 SE Washington, Hillsboro, OR 97123. (503) 648-3414.

April 15, 1983. Fire Research Corp. Technical Seminar on Flowmeters, Foam Systems, and Electronic Pressure Governor Systems, Nesconset, NY. Free. For further information contact: Sales Dept., Fire Research Corporation, 26 Souther Blvd., Nesconset, NY 11767. (516) 724-8888, Telex 967784.

April 15-17, 1983. Fire Chief's Meeting, Phoenix, AZ. For further information contact: Secretary Sam Stanerfer, Arizona Fire Chiefs Association, 2485 Northern Ave., Kingman, AZ 86401. (602) 757-3151.

April 20-23, 1983. Joint Public Education Conference, Wisconsin Fire Inspections Association and Illinois Fire Inspectors Association, Interlocken, WI. For further information contact: Don Nelson, State of Wisconsin, Fire Prevention Section, P.O. Box

7969, Madison, WI 53707. (608) 266-8076 or Danny Nixon, Illinois Fire Inspectors Association, 999 N. Elmhurst Rd., Mt. Prospect, IL 60056. (313) 393-6699.

April 22-23, 1983. Third Statewide Fire Awareness Symposium, Harrisburg, PA. For further information contact: Chet Henry, State Fire Commissioner, 1547 Labor and Industry Building, Harrisburg, PA 17120. (717) 783-8150.

April 25-29, 1983. Fundamentals of Industrial Fire Protection Equipment. Sponsored by Industrial Risk Insurers at the IRI Fire Safety Laboratory in Hartford, CT. Free for IRI insureds; 500 fee for non-insureds. For further information contact: Paul B. Stewart, Administrator of Training, Industrial Risk Insurers, 85 Woodland St., Hartford, CT 06102.

May 1-5, 1983. Fire Chief's Meeting, Fresno, CA. For further information contact: California Fire Chiefs Association, Executive Offices, 1400 K St., Suite 309, Sacramento, CA 95814. (916) 441-0371.

May 2-6, 1983. Dive Rescue I. Sponsored by the International Association of Dive Rescue Specialists in Oregon City, OR. For further information contact: International Association of Dive Rescue Specialists, 2619 Canton Court, Ft. Collins, CO 80525.

May 2-6, 1983. Fundamentals of Industrial Fire Protection Equipment. Sponsored by Industrial Risk Insurers at the IRI Fire Safety Laboratory in Hartford, CT. Free for IRI insureds; $500 fee for non-insureds. For further information contact: Paul B. Stewart, Administrator of Training, Industrial Risk Insurers, 85 Woodland St., Hartford, CT 06102.

May 2-6, 1983. Iowa Fire Department Instructors Conference, Ames, IA.

May 8-10, 1983. Public Education Conference. Anchorage, AK. For further information contact: Ira Bryant, 8131 Lamplighter, Anchorage, AK 99502. (907) 277-3462.

May 8-13, 1983. Tenth World Congress on the Prevention of Occupational Accidents and Diseases. Ottawa, Canada. For further information contact: The Canadian Organizing Committee, The Canadian Centre for Occupational Health and Safety, 500-300 Slater St., Ottawa, Ontario, Canada K1P 6A6. (613) 995-1119, Telex 053-3342.

May 9-13, 1983. Fundamentals of Industrial Fire Protection Equipment. Sponsored by Industrial Risk Insurers at the IRI Fire Safety Laboratory in Hartford, CT. Free for IRI insureds; $500 fee for non-insureds. For further information contact: Paul B. Stewart, Administrator of Training, Industrial Risk Insurers, 85 Woodland St., Hartford, CT 06102.

May 12, 1983. Ottawa, Ontario, Canada. Analyzing Hazards at the Workplace: Methods and Applications. International Section for Research on Prevention of Occupational Risks. For further information contact: B. Moncelon, Centre de Recherche de l'INRS, Avenue de Bourgogne, B.P. No. 27, 54501 Vandoeuvre Cedex, France.

May 13-15, 1983. National Association of Fire Equipment Distributors Annual Meeting, Kansas City, MO. For further information contact: NAFED, 111 E Wacker Dr., Chicago, IL 60601.

May 14, 1983. Fire Service Recognition Day. For a brochure on suggested activities, a model Mayor's Proclamation, and other helpful materials, write to the International Association of Fire Chiefs, 1329-18th St., NW, Washington, DC 20036.

May 16-19, 1983. NFPA Annual Meeting, Kansas City, MO. For further information contact: Meetings Registrar, National Fire Protection Association, Batterymarch Park, Quincy, MA 02269. (617) 328-9290.

May 16-20, 1983. Fundamentals of Industrial Fire Protection Equipment. Sponsored by Industrial Risk Insurers at the IRI Fire Safety Laboratory in Hartford, CT. Free for IRI insureds; $500 fee for non-insureds. For further information contact: Paul B. Stewart, Administrator of Training, Industrial Risk Insurers, 85 Woodland St., Hartford, CT 06102.

May 20, 1983. Fire Research Corp. Technical Seminar on Flowmeters, Foam Systems, and Electronic Pressure Governor Systems. Nesconset, NY. Free. For further information contact: Sales Dept., Fire Research Corporation, 26 Southern Blvd., Nesconset, NY 11767. (516) 724-8888, Telex 967784.

May 23-27, 1983. Dive Rescue I. Sponsored by the International Association of Dive Rescue Specialists in Elgin, IL. For further information contact: International Association of Dive Rescue Specialists, 2619 Canton Court, Ft. Collins, CO 80525.

May 23-27, 1983. Fundamentals of Industrial Fire Protection Equipment. Sponsored by Industrial Risk Insurers at the IRI Fire Safety Laboratory in Hartford, CT. Free for IRI insureds; $500 fee for non-insureds. For further information contact: Paul B. Stewart, Administrator of Training, Industrial Rick Insurers, 85 Woodland St., Hartford, CT 06102.

May 23-27, 1983. International Association of Arson Investigators Annual Seminar, to be held in Tucson, AZ. Projected registration fee (including banquet) of $110. For further information contact: David M. Smith, Tucson Police Dept., 270 S. Stone, Tucson, AZ 85702. (602) 791-4298.

June 2-4, 1983. Fire Chief's Meeting, Devils Lake, ND. For further information contact: Secretary/Treasurer William Stewart, North Dakota Fire Chiefs Association, 501 29th Ave., N, Fargo, ND 58102. (701) 232-6537.

June 6-7, 1983. Riverdale, NY. Regional Fire Engineering Conference, sponsored by the Fire Engineering Institute of the Civil Engineering Dept., Manhattan College. For further information contact: Professor Robert J. Spinna, Conference Director, Fire Engineering Institute, Manhattan College, Riverdale, NY 10471. (212) 920-0173.

June 10-12, 1982. Fire Chief's Meeting, Fairfield Bay, AR. For further information contact: Secretary Clinton McCormack, Arkansas Association of Fire Chiefs, Texarkana Fire Dept., P.O. Box 2711, Texarkana, AR 75501. (501) 772-6437.

June 13-17, 1983. Dive Rescue I. Sponsored by the International Association of Dive Rescue Specialists in Ft. Collins, CO. For further information contact: International Association of Dive Rescue Specialists, 2619 Canton Court, Ft. Collins, CO 80525.

June 17, 1983. Fire Research Corp. Technical Seminar on Flowmeters, Foam Systems, and Electronic Pressure Governor Systems, Nesconset, NY. Free. For further information contact: Sales Dept., Fire Research Corporation, 26 Southern Blvd., Nesconset, NY 11767. (516) 724-8888, Telex 967784.

June 19-21, 1983. Fire Chief's Meeting, Seaside, OR. For further information contact: Secretary Dale Scobee, Oregon Fire Chiefs Association, 2355 Lacey Dr., Hood River, OR 97031.

June 19-23, 1983. ASTM Committee E-5 on Fire Standards Meeting, Kansas City, MO. For further information contact: Jim Thomas, ASTM, 1916 Race St., Philadelphia, PA 19103. (215) 299-5498.

June 19-24, 1983. Dive Rescue II. Sponsored by the International Association of Dive Rescue Specialists in Ft. Collins, CO. For further information contact: International Association of Dive Rescue Specialists, 2619 Canton Court, Ft. Collins, CO 80525.

June 21-24, 1983. 59th Annual Iowa State Fire School, Ames, IA.

June 22, 1983. Kansas City, MO. ASTM Sumposium on Temperature Effects on Concrete (including fire exposure). For further information contact: Pamela Whiteaker, ASTM, 1916 Race St., Philadelphia, PA 19103. (215) 299-5478.

June 23-25, 1983. Fire Chief's Meeting, Steamboat Springs, CO. For further information contact: Secretary Jake Nielson, Colorado Fire Chiefs Association, Littleton, CO 80120.

June 25-28, 1983. Building Owners and Managers Association Annual Meeting. Los Angeles, CA.

July, 1983. Fire Chief's Meeting. For further information contact: Secretary H. Richard Harrigan, Indiana Fire Chiefs Association, P.O. Box 583, Hobart, IN 46342. (219) 942-5184.

July, 1983. Fire Chief's Meeting. For further information contact: Russell McNamee, Michigan Fire Chiefs Association, 111-1 Pine St., Taylor, MI 48180. (313) 287-6580.

July 10-13, 1983. Association of Physical Plant Administrators. Louisville, KY.

July 11-15, 1983. Dive Rescue I. Sponsored by the International Association of Dive Rescue Specialists in Ft. Collins, CO. For further information contact: International Association of Dive Rescue Specialists, 2619 Canton Court, Ft. Collins, CO 80525.

July 13-15, 1983. NFPA Standards Council Meeting, Quincy, MA. For further information contact: Leona Taraskiewicz, National Fire Protection Association, Batterymarch Park, Quincy, MA 02269. (617) 328-9290.

July 13-16, 1983. Fire Chief's Meeting, Richmond, VA. For further information contact: Executive Secretary Sandy Bocas, Virginia Fire Chiefs Association, P.O. Box 753, Richmond, VA 23206. (804) 649-8471.

July 15, 1983. Fire Research Corp. Technical Seminar on Flowmeters, Foam Systems, and Electronic Pressure Governor Systems, Nesconset, NY. Free. For further information contact: Sales Dept., Fire Research Corporation, 26 Southern Blvd., Nesconset, NY 11767. (516) 724-8888, Telex 967784.

July 17-22, 1983. Dive Rescue II. Sponsored by the International Association of Dive Rescue Specialists in Ft. Collins, CO. For further information contact: International Association of Dive Rescue Specialists, 2619 Canton Court, Ft. Collins, CO 80525.

August 1-4, 1983. American Hospital Association, Houston, TX.

August 19, 1983. Fire Research Corp. Technical Seminar on Flowmeters, Foam Systems, and Electronic Pressure Governor Systems, Nesconset, NY. Free. For further information contact: Sales Dept., Fire Research Corporation, 26 Southern Blvd., Nesconset, NY 11767. (516) 724-8888, Telex 967784.

September 8-11, 1983. Iowa Firemen's Convention, Evansdale, IA.

September 16, 1983. Fire Research Corp. Technical Seminar on Flowmeters, Foam Systems, and Electronic Pressure Governor Systems, Nesconset, NY. Free. For further information contact: Sales Dept., Fire Research Corporation, 26 Southern Blvd., Nesconset, NY 11767. (516) 724-8888, Telex 967784.

September 19-22, 1983. UK National Fire Conference and Exhibition. Sponsored by the Chief and Assistant Chief Fire Officers' Association, the Fire Protection Association, and the Institution of Fire Engineers, Blackpool, England. For further information contact: Colin Dann, Fire UK '83, Queensway House, 2 Queensway, Redhill, Surrey, RM1 1QS, England. Telephone Redhill (0737) 68611. Telex 948669 TOPJNL G.

September 26-28, 1983. International Electrical, Electronics, Conference and Exposition. Sponsored by the Institute of Electrical and Electronic Engineers (Canadian Region), Toronto, Canada. For further information contact: Vaughan Taylor, Conference Manager, International Electrical, Electronics Exposition, 1450 Don Mills Rd., Don Mills, Ontario, M3B 2X7. (416) 445-6641.

October 1983. Firemen's Weekend at Great Adventure (theme park in central New Jersey). For further information contact: Burn Foundation of Greater Delaware, 250 S. 17th St., Philadelphia, PA 19103.

October 2, 1983. Fire Fighters' Memorial Sunday, National Fire Academy. For further information contact: Office of Public Affairs, Federal Emergency Management Agency, Washington, DC 20472. (202) 287-0300.

October 3-5, 1983. Fire Retardant Chemicals Association, Hyannis, MA. For more information contact: FRCA, 265 Post Rd. W., P.O. Box 913, Westport, CT 06881. (203) 226-9029.

October 9-15, 1983. Fire Prevention Week. For further information contact: National Fire Protection Association, Batterymarch Park, Quincy, MA 02269. (617) 328-9290.

October 13-15, 1983. Fire Chief's Meeting, St. Paul, MN. For further information contact: Secretary Lyle C. Robinson, Minnesota Fire Chiefs Association, 5800 85th Ave., N, Brooklyn Park, MN 55443.

November 14-17, 1983. NFPA Fall Meeting. For further information contact: Meetings Registrar, National Fire Protection Association, Quincy, MA 02269. (617) 328-9290.

March 28-30, 1984. Fire Retardant Chemicals Association, Pine Mountain, GA. For further information contact: FRCA, 265 Post Rd. W, P.O. Box 913, Westport, CT 06881. (203) 226-9029.

May 21-25, 1984. Fire International '84 Conference and Exhibition, Birmingham, England. For further information contact: Colin Dann, Marketing Manager, International Symposia and Exhibitions Ltd., Queensway House, 2 Queensway, Redhill, Surrey, RM1 1QS, England. Telephone Redhill (0737) 08611. Telex 948669.

1983 Calendar / Arson Seminars

February

Kansas Chapter Arson Seminar
Feb. 16, 17, 18, 1983
Topeka, KS
Reg. fee: not yet set ($25 in 1982)
To register/more information: Paul Markley, Chief, Fire Prevention Division, 109 W. Ninth St., Mills Bldg., Suite 203, Topeka, KS 66612; 913/296-3401.
1984 dates: to be finalized after 1983 seminar.

March

Texas Annual Arson Seminar
March 14-18, 1983
Austin, TX
Villa Capri Motor Hotel Convention Center
(36 hour seminar)
Reg. fee: $125, includes all materials, banquet ticket

WE WANT TO KNOW . . .
if a name, an address, or a phone number has changed; if there's an upcoming event, a new program or course, a new publication being offered. If you have more current information than is contained in this *Almanac*, know something that should be included in this book, or just have something interesting about the fire protection scene that you want to contribute, please let us know. Write: Editor, *Fire Almanac*, NFPA, Batterymarch Park, Quincy, MA 02269. All suggestions will receive our careful attention.

To register/more information: John R. Rauch, Training Specialist, Fire Protection Training Division, Texas A&M University, F.E. Drawer K, College Station, TX 77843; 713/845-7641.
1984 dates: March 12-16, 1984

May

Northwest Fire and Arson Seminar
May 1-5, 1983
Portland, OR
Reg. fee: not yet set (1982: $90 prepaid, $100 at door)
To register/more information: Rex Millard, Chief Investigator, Portland Bureau of Fire, 55 SW Ash St., Portland, OR 97204; 502/248-4363.
1984 dates: to be set September 1983.

International Association of Arson Investigators Annual Seminar
May 23-27, 1983
Tucson, AZ
Reg. fee: $125
To register: Pima Community College, Business/Registration, 1225 N. Tenth Ave., Tucson, AZ 85705; 602/884-6060.
For more information: David M. Smith, Associated Fire Consultants, 10 E. Broadway, Suite 207, Tucson, AZ 85701; 602/624-1215.
1984: Tampa, FL (contact Dan Fries, Largo, FL Fire Dept.)
1985: Vancouver, British Columbia, Canada
1986: Albuquerque, NM

June

Pennsylvania Association of Arson Investigators
June 6-10, 1983.
Pennsylvania University, University Park, PA
Reg. fee: not yet set ($140 in 1982)
To register/more information: Mary Lou Cypher, P.O. Box 236, Saxonburg, PA 16056; 412/352-4101.
1984 dates: to be set in late 1983.

Arson for Profit
Second week of June 1983 (M-F)
West Haven, CT
Reg. fee: $125 non-credit. Call for credit rate.
To register/more information: Fred Mercilliott, Director of Fire Science, University of New Haven, West Haven, CT 06516; 203/934-6321, x 322
1984 dates: June 1984

Arson and Fire Investigation Conference
June 20-24, 1983
New Brunswick, NJ
Reg. fee: $250 (approx.), includes room/board, tuition, materials, banquet
To register/more information: William G. Rae, Extension Specialist, Dept. of Government Services, Building 4053, Kilmer Campus, Rutgers University, New Brunswick, NJ 08903; 201/932-3640.
1984 dates: to be set in Sept. 1983.
Also offer 1 week residential program; 4 night courses (2 per semester, not yet set).

July

Virginia State Arson Investigation School
tentative: late July, early August 1983
Sheraton Patriot Inn, Williamsburg, VA
Reg. fee: $60
To register/more information: W.R. Wetherington, Asst. Director, Bureau of Criminal Investigation, Virginia State Police, P.O. Box 27472, Richmond, VA 23261-7472; 804/323-2053.

August

Ohio Arson School Inc.
August 1-5, 1983
Marriott Inn, 6500 Doubletree Ave., Columbus, OH
Reg. fee: $125 (room/board not included)
To register/more information: Chief Marvin Olney, Franklin Township Fire Dept., 4100 Sullivant Ave., Columbus, OH 43228; 614/279-6373.
1984 dates: to be set in mid-1983.

The 18th Annual Southeastern Arson Seminar
August 26-28, 1983
Center for Continuing Education, University of Georgia, Athens, GA
Reg. fee: not yet set ($70. in 1982)
To register: David Payne, Program Coordinator, Georgia Center for Continuing Education, University of Georgia, Athens, GA 30602; 404/548-1311.

Nebraska State Fire and Arson Investigation Conference
usually August or September
Midtown Holiday Inn
Grand Island, NB
Reg. fee: approx. $75
To register/more information: Gary Schoenrock, Program Coordinator, Dept. of Conferences and Institutes, University of Nebraska, 205 Nebraska Center, Lincoln, NB 68583; 402/472-2844.

September

New Mexico Fire and Arson Seminar
September 26-30, 1983 (tentative)
Albuquerque, NM
Reg. fee: $95 pre-reg./$110 door (tentative)
To register/more information: Jim Gulley, State Farm Insurance, 1325 Wyoming Blvd., NE, Albuquerque, NM 87112; 505/294-2420. OR Charles Ray, 1983 President NM Chapter IAAI, P.O. Box 12072, Albuquerque, NM; 505/265-6601.

October

8th Annual Fire And Arson Conference
not yet set; late October 1983
Hempstead, NY
Reg. fee: 1982 fees: $185 (4 days); $150 (3 days); $50 (1 day)
To register/more information: Dr. Ronald J. Alvarez, Director of Continuing Engineering Education, Hofstra University, Adams Hall, Room 121, Hempstead, NY 11550; 516/560-5548

Oklahoma Fire and Arson Investigators Conference
last week October 1983; tentative Tu-Th (25-27)
Stillwater, OK
Reg. fee: $45 pre-reg./$55 at door

To register/more information: Clifford Lewis, Secretary-Treasurer, IAAI, 315 W. Hurd, Edmond, OK 73034; 405/235-9188.

Oklahoma State University co-sponsors above seminar. OSU also offers a 12-hr. (thru yr) program in basic cause determination (*Fire and Arson Detection*) in conjunction with the National Fire Academy (no NFA certification awarded). For this, contact Jack Gardner, Field Instructor, Oklahoma State University, Stillwater, OK; 405/624-5727.

November

Nevada Arson Seminar
First week November 1983 (tentative)
location not yet set
Reg. fee: $115 for 5 days
To register/more information: Capt. Robert James, Clark County Fire Dept., 707 E. Desert Inn Rd., Las Vegas, NV 89109; 702/876-2698.

1983 Calendar/National Fire Academy Resident Programs

About the National Fire Academy Resident Programs

Courses of the National Fire Academy Resident Program are held at the Academy's campus in Emmitsburg, MD. Classes are scheduled from October to October each year; a class schedule for October 1983 to October 1984 will be available from the National Fire Academy in mid-1983.

Application forms are available from the National Fire Academy, from FEMA regional offices, state fire service training directors, and many metropolitan fire departments. For specific application instructions and course descriptions, write the National Fire Academy Office of Admissions, 16825 S. Seton Ave., Emmitsburg, MD 21727 or call (301) 447-6771 or (800) 638-9600.

April

April ll-May 20, 1983. Senior Fire Officer Program (Plans Review).
April 11-22, 1983. The Chemistry of Hazardous Materials.
April 11-22, 1983. Educational Methodology.
April 11-22, 1983. Fire Service Organization Theory.
April 11-22, 1983. Management of Public Fire Education.
April 11-22, 1983. Plans Review for Inspectors.
April 11-22, 1983. Senior Fire Officer Program (Fire Prevention).
April 11-22, 1983. Use of Microcomputers for Fire Service Management.
April 11-29, 1983. Fire Arson Investigation.
April 11-29, 1983. Fire Prevention Specialist #1/Fire Detection Course.
April 11-29, 1983. Incident Command/Fire Arson Detection.

WE WANT TO KNOW . . .
if a name, an address, or a phone number has changed; if there's an upcoming event, a new program or course, a new publication being offered. If you have more current information than is contained in this *Almanac*, know something that should be included in this book, or just have something interesting about the fire protection scene that you want to contribute, please let us know. Write: Editor, *Fire Almanac*, NFPA, Batterymarch Park, Quincy, MA 02269. All suggestions will receive our careful attention.

April 26-May 5, 1983. Interpersonal Dynamics in Fire Service Organizations.
April 25-May 6, 1983. Advanced Incident Command.
April 25-May 6, 1983. Executive Development III.
April 25-May 6, 1983. Fire Prevention Specialist II.
April 25-May 6, 1983. Hazardous Materials Considerations.
April 25-May 6, 1983. Managing the Codes Process.
April 25-May 6, 1983. Management of Emergency Medical Service.
April 25-May 6, 1983. Senior Fire Officer Program (Specialist II).
April 25-May 13, 1983. Fire Service Leadership/Communications.

May
May 7-20, 1983. Senior Fire Officer Program (Codes).
May 9-20, 1983. Fire Prevention Specialist II.
May 9-20, 1983. Fire Service Organization Theory.
May 9-20, 1983. Planning for a Hazardous Materials Incident.
May 9-20, 1983. Plans Review for Inspectors.
May 9-20, 1983. Use of Microcomputers for Fire Service Management.
May 9-27, 1983. Fire Arson Investigation.
May 23-June 3, 1983. The Chemistry of Hazardous Materials.
May 23-June 3, 1983. Fire Prevention Specialist I.
May 23-June 3, 1983. Incident Command.
May 30-June 10, 1983. Educational Methodology.
May 30-June 10, 1983. Management of Emergency Medical Service.
May 23-June 3, 1983. Interpersonal Dynamics in Fire Service Organizations.
May 30-June 17, 1983. Fire Service Leadership/Communications.

June
June 6-16, 1983. Fire Prevention Specialist II.
June 6-17, 1983. Advanced Incident Command.
June 6-17, 1983. Fire Service Organization Theory.
June 6-17, 1983. Hazardous Materials Considerations.
June 6-17, 1983. Management of Public Fire Education.
June 13-July 1, 1983. Fire Arson Investigation.
June 13-24, 1983. Plans Review for Inspectors.
June 13-24, 1983. Use of Microcomputers for Fire Service Management.
June 20-July 1, 1983. The Chemistry of Hazardous Materials.
June 20-July 1, 1983. Executive Development III.
June 20-July 1, 1983. Fire Prevention Specialist II.
June 20-July 1, 1983. Incident Command.
June 30-July 1, 1983. Interpersonal Dynamics in Fire Service Organizations.

July
July 11-29, 1983. Fire Arson Investigation.
July 11-29, 1983. Fire Prevention Specialist I/Fire Prevention Course.
July 11-29, 1983. Fire Service Leadership/Communications.
July 11-29, 1983. Incident Command/Fire Arson Detection.
July 11-22, 1983. The Chemistry of Hazardous Materials.
July 11-22, 1983. Educational Methodology.
July 11-22, 1983. Fire Service Organization Theory.
July 11-22, 1983. Management of Emergency Medical Service.
July 11-22, 1983. Management of Public Fire Education.
July 11-22, 1983. Use of Microcomputers for Fire Service Management.
July 11-August 26, 1983. Executive Development II, Fire Service Organization Theory, and Interpersonal Dynamics in Fire Service Organizations.

July 25-August 5, 1983. Advanced Incident Command.
July 25-August 5, 1983. Executive Development III.
July 25-August 5, 1983. Fire Prevention Specialist II.
July 25-August 5, 1983. Hazardous Materials Considerations.
July 25-August 5, 1983. Interpersonal Dynamics in Fire Service Organizations.
July 25-August 5, 1983. Senior Fire Officer Program (Specialist II).

August
August 1-12, 1983. Use of Microcomputers for Fire Service Management.
August 8-19, 1983. The Chemistry of Hazardous Materials.
August 8-19, 1983. Fire Prevention Specialist II.
August 8-19, 1983. Fire Service Organization Theory.
August 8-19, 1983. Incident Command.
August 8-19, 1983. Planning for a Hazardous Materials Incident.
August 8-19, 1983. Plans Review for Inspectors.
August 8-19, 1983. Senior Fire Officer Program (Plans).
August 8-26, 1983. Fire Arson Investigation.
August 8-26, 1983. Fire Service Leadership/Communications.
August 22-September 2, 1983. Advanced Incident Command.
August 22-September 2, 1983. Fire Prevention Specialist I.
August 22-September 2, 1983. Hazardous Materials Considerations.
August 22-September 2, 1983. Interpersonal Dynamics in Fire Service Organizations.
August 22-September 2, 1983. Management of Emergency Medical Service.
August 22-September 2, 1983. Managing the Codes Process.
August 22-September 2, 1983. Senior Fire Officer Program (Codes).

September
September 12-23, 1983. The Chemistry of Hazardous Materials.
September 12-23, 1983. Educational Methodology.
September 12-23, 1983. Executive Development III.
September 12-23, 1983. Fire Prevention Specialist I.
September 12-23, 1983. Incident Command.
September 12-23, 1983. Interpersonal Dynamics in Fire Service Organizations.
September 12-30, 1983. Fire Arson Investigation.
September 19-30, 1983. Use of Microcomputers for Fire Service Managment.
September 26-October 7, 1983. Advanced Incident Command.
September 26-October 7, 1983. Fire Prevention Specialist II.
September 26-October 7, 1983. Fire Service Organization Theory.
September 26-October 7, 1983. Hazardous Materials Considerations.
September 26-October 7, 1983. Management of Public Fire Education.

1983 Calendar / National Fire Academy Field Programs

About the National Fire Academy Field Program

In cooperation with state sponsors, the National Fire Academy sponsors "outreach" training through the Field Programs. These courses are intensive, short-term (usually 12-14 hours) training experiences normally held on weekends.

The state sponsors handle all course registration and should be contacted for additional information. (The contact follows the course listing.)

Since courses are scheduled according to the federal fiscal year, this section only lists courses to be held before Oct. 1, 1983. The National Fire Academy will issue its calendar for Oct. 1983-Oct. 1984 in mid-1983.

April

April 7-8, 1983. Hazardous Materials Incident Analysis. National Fire Academy Field Program held in Honolulu, HI. For further information contact: Sid Wilson, Battalion Chief, City and County of Honolulu Fire Dept., 1455 S. Beretania St., Room 313, Honolulu, HI 96814. (808) 955-8139.

April 9-10, 1983. Building Construction for Fire Suppression Forces. National Fire Academy Field Program held in North Platte, NE. For further information contact: Wayne McLaughlin, Director, Nebraska Fire Service, Dept. of Education, 3721 W. Cuming, Lincoln, NE 68524-1896. (402) 471-2803.

April 9-10, 1983. Fire Apparatus Purchase and Maintenance. National Fire Academy Field Program held in Mahwah or Glassboro, NJ. For further information contact: August G. Brummer, Director, Fire Division, New Jersey State Safety Council, Inc., New Jersey State Fire College, 50 Park Place, Newark, NJ 07102. (201) 642-3123.

April 9-10, 1983. Fire Apparatus Purchase and Maintenance. National Fire Academy Field Program held in Reynoldsburg, OH. For further information contact: Gregory Drew, Superintendent, Ohio Fire Academy, Ohio State Fire Marshal's Office, 8895 E. Main St., Reynoldsburg, OH 43068. (614) 864-5510.

April 9-10, 1983. Fire/Arson Detection. National Fire Academy Field Program held in Concord, NH. For further information contact: Barry Bush, Chief of Fire Service Training, New Hampshire Fire Standards and Training Commission, 18 Low Ave., Concord, NH 03301. (603) 271-2661.

April 9-10, 1983. Fire Incident Management. National Fire Academy Field Program held in Fayetteville, AR. For further information contact: Paul S. Benton, Director, Arkansas Fire Academy, P.O. Box 3048, East Camden, AR 71701. (501) 574-1521 or (501) 574-0741.

April 9-10, 1983. Fire Prevention I. National Fire Academy Field Program held in Concord, NH. For further information contact: Barry Bush, Chief of Fire Service Training, New Hampshire Fire Standards and Training Commission, 18 Low Ave., Concord, NH 03301. (603) 271-2661.

April 9-10, 1983. Hazardous Materials Incident Analysis. National Fire Academy Field Program held in North Platte, NE. For further information contact: Wayne McLaughlin, Director, Nebraska Fire Service, Dept. of Education, 3721 W. Cuming, Lincoln, NE 68524-1896. (402) 471-2803.

April 9-10, 1983. Hazardous Materials Incident Analysis. National Fire Academy Field Program held in Reynoldsburg, OH. For further information contact: Gregory Drew, Superintendent, Ohio Fire Academy, Ohio State Fire Marshal's Office, 8895 E. Main St., Reynoldsburg, OH 43068. (614) 864-5510.

WE WANT TO KNOW . . .

if a name, an address, or a phone number has changed; if there's an upcoming event, a new program or course, a new publication being offered. If you have more current information than is contained in this *Almanac*, know something that should be included in this book, or just have something interesting about the fire protection scene that you want to contribute, please let us know. Write: Editor, *Fire Almanac*, NFPA, Batterymarch Park, Quincy, MA 02269. All suggestions will receive our careful attention.

April 9-10, 1983. Public Fire Education Planning. National Fire Academy Field Program held in Jackson, TN. For further information contact: Rick Duffy, Coordinator, Tennessee State Fire School, Dept. of Vocational Education, Murfreesboro Area Vocational and Technical School, 1303 Old Fort Parkway, Murfreesboro, TN 37130. (615) 893-4095.

April 9-10, 1983. Volunteer Fire Service Management. National Fire Academy Field Program held in Mahwah or Glassboro, NJ. For further information contact: August G. Brummer, Director, Fire Division, New Jersey State Safety Council, Inc., New Jersey State Fire College, 50 Park Place, Newark, NJ 07102. (201) 642-3123.

April 9-10, 1983. Public Fire Education Planning. National Fire Academy Field Program held in Sudbury, MA. For further information contact: Stephen Coan, Interim Director, Massachusetts Firefighting Academy, Commonwealth of Massachusetts, 59 Horse Pond Rd., Sudbury, MA 01776. (617) 443-8926 or (617) 727-9635.

April 11-12, 1983. Fire/Arson Detection. National Fire Academy Field Program held in the District of Columbia. For further information contact: William M. King, Deputy Fire Chief, Training Academy, Government of the District of Columbia Fire Dept., 4600 Overlook Ave., SW, Washington, DC 20032. (202) 745-2245.

April 14-15, 1983. Pesticide Fire and Spill Control. National Fire Academy Field Program held in Richfield, UT. For further information contact: Gordon D. Evans, Director of Fire Science, Utah Technical College at Provo, P.O. Box 1609, Provo, UT 84601. (801) 226-5000.

April 15-16, 1983. Building Construction for Fire Suppression Forces. National Fire Academy Field Program held in Pierre, SD. For further information contact: Jim Flippin, State Coordinator, Fire Service Training, 118 W. Capitol, Pierre, SD (605) 773-3876.

April 16-17, 1983. Fire Apparatus Purchase and Maintenance. National Fire Academy Field Program held in Elko, NV. For further information contact: Dave Stephan, Deputy State Fire Marshal, State Fire Marshal Division, Fire Training Section, Capitol Complex, Carson City, NV 89710. (702) 885-4290.

April 16-17, 1983. Fire Apparatus Purchase and Maintenance. National Fire Academy Field Program held in Murfreesboro, TN. For further information contact: Rick Duffy, Coordinator, Tennessee State Fire School, Dept. of Vocational Education, Murfreesboro Area Vocational and Technical School, 1303 Old Fort Parkway, Murfreesboro, TN 37130. (615) 893-4095.

April 16-17, 1983. Fire Incident Management. National Fire Academy Field Program held in Juneau, AK. For further information contact: William A. Hagevig, Supervisor, Fire Service Training, Adult and Continuing Education, Pouch F, State Office Building, Juneau, AK 99811. (907) 465-4685.

April 16-17, 1983. Fire Incident Management. National Fire Academy Field Program held in Concord, NH. For further information contact: Barry Bush, Chief of Fire Service Training, New Hampshire Fire Standards and Training Commission, 18 Low Ave., Concord, NH 03301. (603) 271-2661.

April 16-17, 1983. Fire Prevention I. National Fire Academy Field Program held in Lansing, MI. For further information contact: Phillip K. Alber, Executive Secretary, Michigan Fire Fighters Training Council, Michigan State Police, 7150 Harris Dr., Lansing, MI 48913. (517) 322-1922.

April 16-17, 1983. Hazardous Materials Incident Analysis. National Fire Academy Field Program held in Bartlesville, OK. For further information contact: Nancy Trench, Supervisor, Fire Service Training, Oklahoma State University, Fire Building, Stillwater, OK 74078. (405) 624-5727.

April 16-17, 1983. Hazardous Materials Incident Analysis. National Fire Academy Field Program held in Concord, NH. For further information contact: Barry Bush, Chief of Fire Service Training, New Hampshire Fire Standards and Training Commission, 18 Low Ave., Concord, NH. 03301. (603) 271-2661.

April 16-17, 1983. Volunteer Fire Service Management. National Fire Academy Field Program held in Lansing, MI. For further information contact: Phillip K. Alber, Executive Secretary, Michigan Fire Fighters Training Council, Michigan State Police, 7150 Harris Dr., Lansing, MI 48913. (517) 322-1922.

April 16-17, 1983. Volunteer Fire Service Management. National Fire Academy Field Program held in College Park, MD. For further information contact: John W. Hoglund, Director, Maryland Fire and Rescue Institute, University of Maryland, College Park, Maryland 20742. (301) 454-2416.

April 17-18, 1983. Pesticide Fire and Spill Control. National Fire Academy Field Program held at Alexandria, VA. For further information contact the Dept. of Fire Programs, Commonwealth of Virginia, 2720 Enterprise Parkway, Suite 106, Richmond, VA 23229. (804) 281-9441.

April 22-24, 1983. Emergency Medical Services Administration. National Fire Academy Field Program held in Yakima, WA. For further information contact: Ed Pendergrast, Director, Fire Service Training, Washington State Commission for Vocational Education, Airdustrial Park, Building 17, LS-10, Olympia, WA 98504. (206) 753-5679.

April 22-24, 1983. Pesticide Fire and Spill Control. National Fire Academy Field Program held at Yakima, WA. For further information contact: Ed Pendergrast, Director, Fire Service Training, Washington State Commission for Vocational Education, Airdustrial Park, Building 17, LS-10, Olympia, WA 98504. (206) 753-5679.

April 23-24, 1983. Building Construction for Fire Suppression Forces. National Fire Academy Field Program held in Missoula, MT. For further information contact: Seldon Weedon, Director, Montana Fire Services Training School, 2100 16th Ave. S., Great Falls, MT 59405. (406) 761-7885.

April 23-24, 1983. Building Construction for Fire Suppression Forces. National Fire Academy Field Program held at Lincoln, RI. For further information contact: Ronald S. Jones, Coordinator, Community College of Rhode Island, Fire Science and Fire Service Training, 25 Althea Dr., Cranston, RI. (401) 781-6147.

April 23-24, 1983. Fire Apparatus Purchase and Maintenance. National Fire Academy Field Program held in Lincoln, NE. For further information contact: Wayne McLaughlin, Director, Nebraska Fire Service, Dept. of Education, 3721 W. Cummings, Lincoln, NE 68524-1896. (402) 471-2803.

April 23-24, 1983. Fire Apparatus Purchase and Maintenance. National Fire Academy Field Program held in Farmington, NM. For further information contact: Carl Standefer, Deputy Fire Marshal, State Fire Marshal's Office, P.O. Drawer 1269, Santa Fe, NM 87501. (505) 827-2357.

April 23-24, 1983. Fire Incident Management. National Fire Academy Field Program held in Erie County, NY. For further information contact: Francis A. McGarry, State Fire Administrator, Office of Fire Prevention and Control, New York State Dept., 162 Washington Ave., Albany, NY 12231. (518) 474-6746.

April 23-24, 1983. Fire Incident Management. National Fire Academy Field Program held in Lincoln, NE. For further information contact: Wayne McLaughlin, Director, Nebraska Fire Service, Dept. of Education, 3721 W. Cummings, Lincoln, NE 68524-1896. (402) 471-2803.

April 23-24, 1983. Fire Prevention I. National Fire Academy Field Program held in Sheridan, WY. For further information contact: Frederick "Pete" Cachat, Fire Training

Officer, Fire Prevention and Electrical Safety, 506 W. 17th, Cheyenne, WY 82002. (307) 777-7288.

April 23-24, 1983. Hazardous Materials Incident Analysis. National Fire Academy Field Program held in Waterbury, CT. For further information contact: Wayne Sandford, Director of Fire Training and Education, Commission on Fire Prevention and Control, 294 Colony St., Meriden, CT 06450. (203) 238-6587.

April 23-24, 1983. Hazardous Materials Incident Analysis (Weekend Educational Opportunity at the National Fire Academy). For further information contact: National Fire Academy Office of Admissions, 16825 S. Seton Ave., Emmitsburg, MD 21727. (301) 447-6771 or (800) 638-9600.

April 23-24, 1983. Public Fire Education Planning. National Fire Academy Field Program held in Mayville, TN. For further information contact: Rick Duffy, Coordinator, Tennessee State Fire School, Dept. of Vocational Education, Murfreesboro Area Vocational and Technical School, 1303 Old Fort Parkway, Murfreesboro, TN 37130. (615) 893-4095.

April 23-24, 1983. Volunteer Fire Service Management. National Fire Academy Field Program held in Farmington, NM. For further information contact: Carl Standefer, Deputy Fire Marshal, State Fire Marshal's Office, P.O. Drawer 1269, Santa Fe, NM 87501. (505) 827-2357.

April 30-May 1, 1983. Volunteer Fire Service Management. National Fire Academy Field Program held in Jackson's Mill, WV. For further information contact: Arnett B. Corley, Jr., State Fire Administrator, West Virginia State Fire Commission, State Capitol Complex, Charleston, WV 25305. (304) 348-2191.

May

May 7-8, 1983. Public Fire Education Planning. National Fire Academy Field Program held in South Portland, ME. For further information contact: Stephen D. Willis, Consultant, Fire Service Training, Bureau of Vocational Education, Dept. of Education and Cultural Services, Station No. 23, Augusta, ME 04330. (207) 289-2621.

May 7-8, 1983. Volunteer Fire Service Management. National Fire Academy Field Program held in Asheville, NC. For further information contact: Ken Farmer, Executive Director, NC State Fire Commission, Dept. of Crime Control and Public Safety, 116 W. Jones St., Raleigh, NC 27611. (919) 733-7650.

May 14-15, 1983. Building Construction for Fire Suppression Forces. National Fire Academy Field Program held in Portland, OR. For further information contact: Helen Moskal, Deputy Director, Fire Standards and Accreditation Board, 3000 Market St., NE, Suite 258, Salem, OR 97310. (503) 378-5210.

May 14-15, 1983. Building Construction for Fire Suppression Forces. National Fire Academy Field Program held in Phoenix, AZ. For further information contact: Herb Hoey, Director of Fire Training, Arizona Division of Emergency Services, Office of the State Fire Marshal, 5636 E. McDowell Rd., Phoenix, AZ 85008. (602) 273-9885.

WE WANT TO KNOW . . .

if a name, an address, or a phone number has changed; if there's an upcoming event, a new program or course, a new publication being offered. If you have more current information than is contained in this *Almanac*, know something that should be included in this book, or just have something interesting about the fire protection scene that you want to contribute, please let us know. Write: Editor, *Fire Almanac*, NFPA, Batterymarch Park, Quincy, MA 02269. All suggestions will receive our careful attention.

May 14-15, 1983. Emergency Medical Services Administration. National Fire Academy Field Program held in Phoenix, AZ. For further information contact: Herb Hoey, Director of Fire Training, Arizona Division of Emergency Services, Office of the State Fire Marshal, 5636 E. McDowell Rd., Phoenix, AZ 85008. (602) 273-9885.

May 14-15, 1983. Fire/Arson Detection. National Fire Academy Field Program held in Eau Claire, WI. For further information contact: Paul F. Pribyl, Consultant, Fire Education and Training, bureau of Program Development and Operation, Wisconsin Board of Vocational, Technical, and Adult Education, 4802 Sheboygan Ave., 7th Floor, P.O. Box 7874, Madison, WI 53707. (608) 266-7994.

May 14-15, 1983. Fire/Arson Detection. National Fire Academy Field Program held in Petersburg, VA. For further information contact the Dept. of Fire Programs, Commonwealth of Virginia, 2720 Enterprise Parkway, Suite 106, Richmond, VA 23229. (804) 281-9441.

May 14-15, 1983. Fire Incident Management. National Fire Academy Field Program held in Morehead, KY. For further information contact: Robert L. Brown, Supervisor, Public Service Occupations Unit, Kentucky Dept. of Education, Bureau of Vocational Education, 21st Floor, Capital Plaza Tower, Frankfort, KY 40601. (502) 564-2326.

May 14-15, 1983. Fire Incident Management. National Fire Academy Field Program held in Daytona Beach, FL. For further information contact: Fred C. Stark, Acting Bureau Chief, Fire Standards and Training, Florida State Fire Marshal's Office, 1501 SW Broadway, Ocala, FL 32675. (904) 732-0526.

May 14-15, 1983. Fire Incident Management. National Fire Academy Field Program held in Phoenix, AZ. For further information contact: Herb Hoey, Director of Fire Training, Arizona Division of Emergency Services, Office of the State Fire Marshal, 5636 E. McDowell Rd., Phoenix, AZ 85008. (602) 273-9885.

May 14-15, 1983. Public Fire Education Planning. National Fire Academy Field Program held in Gadsen, AL. For further information contact: Robert E. Hagler, Director, Alabama State Fire College, Shelton State Community College, 2015 McFarland Blvd. E, Tuscaloosa, AL 35405. (205) 348-6241.

May 14-15, 1983. Public Fire Education Planning. National Fire Academy Field Program held in Phoenix, AZ. For further information contact: Herb Hoey, Director of Fire Training, Arizona Division of Emergency Services, Office of the State Fire Marshal, 5636 E. McDowell Rd., Phoenix, AZ 85008. (602) 273-9885.

May 14-15, 1983. Public Fire Education Planning. National Fire Academy Field Program held in New Haven, CT. For further information contact: Wayne Sandford, Director of Fire Training and Education, Commission on Fire Prevention and Control, 294 Colony St., Meriden, CT 06450. (203) 238-6587.

May 14-15, 1983. Public Fire Education Planning. National Fire Academy Field Program held in Baton Rouge, LA. For further information contact: Thomas Hebert, Director, Firemen Training Program, Pleasant Hall, Louisiana State University, Baton Rouge, LA 70703. (504) 766-0600.

May 14-15, 1983. Volunteer Fire Service Management. National Fire Academy Field Program held in Eau Claire, WI. For further information contact: Paul F. Pribyl, Consultant, Fire Education and Training, Bureau of Program Development and Operation, Wisconsin Board of Vocational, Technical, and Adult Education, 4802 Sheboygan Ave., 7th Floor, P.O. Box 7874, Madison, WI 53707. (608) 266-7994.

May 21-22, 1983. Fire Incident Management. (Weekend Educational Opportunity at the National Fire Academy). For further information contact: National Fire Academy Office of Admissions, 16825 S. Seton Ave., Emmitsburg, MD 21727. (301) 447-6771 or (800) 638-9600.

May 21-22, 1983. Instructional Techniques for Company Officers. National Fire Academy Field Program held in St. Paul, MN. For further information contact: Sharon K. Grossbach, Manager, Adult Vocational Section, Minnesota Dept. of Education, 529 Capitol Square Building, 550 Cedar St., St. Paul, MN 55101. (612) 296-6516.

May 21-22, 1983. Volunteer Fire Service Management. National Fire Academy Field Program held in York/Cherokee/Lancaster region. For further information contact: Joseph M. McDonagh, Director, South Carolina Fire Academy, State Board for Technical Comprehensive Education, West Columbia, SC 29169. (803) 758-8411.

May 28-29, 1983. Building Construction for Fire Suppression Forces. (Weekend Educational Opportunity at the National Fire Academy). For further information contact: National Fire Academy Office of Admissions, 16825 S. Seton Ave., Emmitsburg, MD 21727. (301) 447-6771 or (800) 638-9600.

June

June 4-5, 1983. Emergency Medical Services Administration. National Fire Academy Field Program held in La Grande, OR. For further information contact: Helen Moskal, Deputy Director, Fire Standards and Accreditation Bord, 3000 Market St. NE, Suite 258, Salem, OR 97310. (503) 378-5210.

June 4-5, 1983. Instructional Techniques for Company Officers. National Fire Academy Field Program held in Orono, ME. For further information contact: Stephen D. Willis, Consultant, Fire Service Training, Bureau of Vocational Education, Dept. of Education and Cultural Services, Station No. 23, Augusta, ME 04330. (207) 289-2621.

June 4-6, 1983. Public Fire Education Planning. National Fire Academy Field Program held in Sturgis, SD. For further information contact: Jim Flippin, State Coordinator, Fire Service Training, 118 W. Capitol, Pierre, SD. (605) 773-3876.

June 10-11, 1983. Instructional Techniques for Company Officers. National Fire Academy Field Program held in Price, UT. For further information contact: Gordon D. Evans, Director of Fire Science, Utah Technical College at Provo, P.O. Box 1609, Provo, UT 84601. (801) 226-5000.

June 11-12, 1983. Fire Incident Management. National Fire Academy Field Program held in O'Fallon, MO. For further information contact: Bill Westhoff, Jr., Director, Missouri Fire and Rescue Training Institute, 1001 Ashland Gravel Rd., Columbia, MO 65211. (314) 882-4735.

June 18-19, 1983. Fire Apparatus Purchase and Maintenance. National Fire Academy Field Program held in Las Cruces, NM. For further information contact: Carl Standefer, Deputy State Fire Marshal, State Fire Marshal's Office, P.O. Drawer 1269, Santa Fe, NM 87501. (505) 827-2357.

June 18-19, 1983. Volunteer Fire Service Management. National Fire Academy Field Program held in Las Cruces, NM. For further information contact: Carl Standefer, Deputy State Fire Marshal, State Fire Marshal's Office, P.O. Drawer 1269, Santa Fe, NM 87501. (505) 827-2357.

June 22-24, 1983. Building Construction for Fire Suppression Forces. National Fire Academy Field Program held in the Coeur d'Alene area. For further information contact: Tom Tyree, Director, Fire Service Training, College of Southern Idaho, P.O. Box 1238, Twin Falls, ID 83301. (208) 733-9554, ext. 286.

June 22-24, 1983. Fire Prevention I. National Fire Academy Field Program held in the Coeur d'Alene area. For further information contact: Tom Tyree, Director, Fire Service Training, College of Southern Idaho, P.O. Box 1238, Twin Falls, ID 83301. (208) 733-9554, ext. 286.

June 22-24, 1983. Hazardous Materials Incident Analysis. National Fire Academy Field Program held in the Coeur d'Alene area. For further information contact: Tom Tyree, Director, Fire Service Training, College of Southern Idaho, P.O. Box 1238, Twin Falls, ID 83301. (208) 733-9554, ext. 286.

July

July 9-10, 1983. Building Construction for Fire Suppression Forces. National Fire Academy Field Program held in Riverton, WY. For further information contact: Frederick "Pete" Cachat, Fire Training Officer, Fire Prevention and Electrical Safety, 506 W. 17th, Cheyenne, WY 82002. (307) 777-7288.

July 23-24, 1983. Instructional Techniques for Company Officers. (Weekend Educational Opportunity at the National Fire Academy). For further information contact: National Fire Academy Office of Admissions, 16825 S. Seton Ave., Emmitsburg, MD 21727. (301) 447-6771 or (800) 638-9600.

July 26-27, 1983. Fire/Arson Detection. National Fire Academy Field Program held in Marietta, GA. For further information contact: Harold G. Thompson, Superintendent, Georgia Fire Academy, Dept. of Public Safety, 1112 Clay St., Marietta, GA 30060. (404) 424-7315.

August

August 6-7, 1983. Fire/Arson Detection. (Weekend Educational Opportunity at the National Fire Academy). For further information contact: National Fire Academy Office of Admissions, 16825 S. Seton Ave., Emmitsburg, MD 21727. (301) 447-6771 or (800) 638-9600.

August 10-11, 1983. Emergency Medical Services Administration. National Fire Academy Field Program held in Columbia, MO. For further information contact: Bill Westhoff, Jr., Director, Missouri Fire and Rescue Training Institute, 1001 Ashland Gravel Rd., Columbia, MO 65211. (314) 882-4735.

August 13-14, 1983. Building Construction for Fire Suppression Forces. National Fire Academy Field Program held in Columbia, MO. For further information contact: Bill Westhoff, Jr., Director, Missouri and Fire and Rescue Training Institute, 1001 Ashland Gravel Rd., Columbia, MO 65211. (314) 882-4735.

August 13-14, 1983. Hazardous Materials Incident Analysis. National Fire Academy Field Program held in Morgantown, WV. For further information contact: Arnett B. Corley, Jr., State Fire Administrator, West Virginia State Fire Commission, State Capitol Complex, Charleston, WV 25305. (304) 348-2191).

August 13-14, 1983. Volunteer Fire Service Management. National Fire Academy Field Program held in Presque Isle, ME. For further information contact: Stephen D. Willis, Consultant, Fire Service Training, Bureau of Vocational Education, Dept. of Education and Cultural Services, Station No. 23, Augusta, ME 04330. (207) 289-2621.

August 20-21, 1983. Building Construction for Fire Suppression Forces. National Fire Academy Field Program held in Ocala, FL. For further information contact: Fred C. Stark, Acting Bureau Chief, Fire Standards and Training, Florida State Fire Marshal's Office, 1501 SW Broadway, Ocala, FL 32675. (904) 732-0526.

August 20-21, 1983. Hazardous Materials Incident Analysis. (Weekend Educational Opportunity at the National Fire Academy). For further information contact: National Fire Academy Office of Admissions, 16825 S. Seton Ave., Emmitsburg, MD 21727. (301) 447-6771 or (800) 638-9600.

August 20-21, 1983. Hazardous Materials Incident Analysis. National Fire Academy Field Program held in Malvern, AR. For further information contact: Paul S. Benton, Director, Arkansas Fire Academy, P.O. Box 3048, East Camden, AR 71701. (501) 574-1521 or (501) 574-0741.

September

September 3-4, 1983. Pesticide Fire and Spill Control. National Fire Academy Field Program held in Sedgewick County, KS. For further information contact: Max M. Thomas, Director, Fire Service Training Division, University of Kansas, 645 New Hampshire Ave., Lawrence, KS 60045. (913) 864-4467.

September 9-10, 1983. Building Construction for Fire Suppression Forces. National Fire Academy Field Program held in Sandy, UT. For further information contact: Gordon D. Evans, Director of Fire Science, Utah Technical College at Provo, P.O. Box 1609, Provo, UT 84601. (801) 226-5000.

September 10-11, 1983. Fire/Arson Detection. National Fire Academy Field Program held in Butte, MT. For further information contact: Seldon Weedon, Director, Montana Fire Services Training School, 2100 16th Ave. S., Great Falls, MT 59405. (406) 761-7885.

September 10-11, 1983. Volunteer Fire Service Management. National Fire Academy Field Program held in Sanford, ME. For further information contact: Stephen D. Willis, Consultant, Fire Service Training, Bureau of Vocational Education, Dept. of Education and Cultural Services, Station No. 23, Augusta, ME 04330. (207) 289-2621.

September 17-18, 1983. Instructional Techniques for Company Officers. National Fire Academy Field Program held in Greensboro, NC. For further information contact: Ken Farmer, Executive Director, NC State Fire Commission, Dept. of Crime Control and Public Safety, 116 W. Jones St., Raleigh, NC 27611. (919) 733-7650.

September 21-22, 1983. Instructional Techniques for Company Officers. National Fire Academy Field Program held in College Station, TX. For further information contact: Henry Smith, Division Head, Fire Protection Training Division, Texas Engineering Extension Service, F.E. Drawer, K, College Station, TX 77843. (713) 845-7641.

September 21-22, 1983. Public Fire Education Planning. National Fire Academy Field Program held in College Station, TX. For further information contact: Henry Smith, Division Head, Fire Protection Training Division, Texas Engineering Extension Service, F.E. Drawer K, College Station, TX 77843. (713) 845-7641.

September 22-23, 1983. Fire Incident Management. National Fire Academy Field Program held in Honolulu, HI. For further information contact: Sid Wilson, Battalion Chief, City and County of Honolulu Fire Dept., 1455 S. Beretania St., Room 313, Honolulu, HI 96814. (808) 955-8139.

September 24-25, 1983. Building Construction for Fire Suppression Forces. (Weekend Educational Opportunity at the National Fire Academy). For further information contact: National Fire Academy Office of Admissions, 16825 S. Seton Ave., Emmitsburg, MD 21727. (301) 447-6771 or (800) 638-9600.

September 24-25, 1983. Fire Incident Management. National Fire Academy Field Program held in Green River or Rock Springs, WY. For further information contact: Frederick "Pete" Cachat, Fire Training Officer, Fire Prevention and Electrical Safety, 506 W. 17th, Cheyenne, WY 82002. (307) 777-7288.

September 24-25, 1983. Fire Incident Management. National Fire Academy Field Program held in East Camden, AR. For further information contact: Paul S. Benton, Director, Arkansas Fire Academy, P.O. Box 3048, East Camden, AR 71701. (501) 574-1521 or (501) 574-0741.

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if a name, an address, or a phone number has changed; if there's an upcoming event, a new program or course, a new publication being offered. If you have more current information than is contained in this *Almanac*, know something that should be included in this book, or just have something interesting about the fire protection scene that you want to contribute, please let us know. Write: Editor, *Fire Almanac*, NFPA, Batterymarch Park, Quincy, MA 02269. All suggestions will receive our careful attention.

Fire Fighters' Musters and Similar Events/1983

Source: The Fairchester Hose Haulers Association

Fire fighters have always taken pride in their apparatus and the accomplishment of strong teamwork and spirit. In the early 1800s, fire companies challenged each other to public demonstrations of their abilities. Muscle and machine were placed in competition against each other. First it was the highest stream of water directed vertically against the City Hall flag pole, then steam power vs. muscle power. As time went by, it became steam and horsepower vs. motor-powered apparatus. The challenges were met with great vigor. Professional fire fighters or "vamps," as volunteer fire fighters became known, because of the gaily colored socks called "vamps" worn by old-time volunteers, continue to accept the challenges at musters held locally around the country. Musters for 1983 are listed here.

February

Mini Muster for Model Fire Apparatus (under 60 inches long) and
Firematic Flea Market (9 am to 4 pm)
Sheraton Motor Inn
Liverpool, NY
New York Thruway Exit 37 and
Electronics Parkway
Feb. 26, 1983
Sponsor:
Central New York Chapter,
SPAAMFAA
Contact:
Peter J. DeSalvo
P.O. Box 2433
Syracuse, NY 13220

Winter Muster, Florida Antique Bucket Brigade
State Fairgrounds, US 301 and I-4
Tampa, FL
Feb. 26, 1983
Contact:
Gary Rorabacher
1514 W. Palm Circle
Valrico, FL 33594

March

None scheduled

April

175th Anniversary Antique Apparatus Muster
Easton, MD
April 23-24, 1983
Contact:
Easton Volunteer Fire Department
P.O. Box 851
Easton, MD 21601

May

6th Annual Fire Apparatus Show and Muster
Randhurst Shopping Center
Rte 83 and Euclid Ave.
Mt. Prospect, IL
May 7, 1983
Sponsors:
Fire Buffs of Illinois
Mt. Prospect Fire Dept., and
Randhurst Center
Contact:
Jack Connors
5420 S. Kedvale
Chicago, IL 60632

Renault Winery Spring Muster
Egg Harbor, NJ
May 7, 1983
Contact:
James Mulch
Glasstown Antique Fire
Brigade
120 Woodland Ave.
Pitman, NJ 08071

Muster, Ft. McHenry
Baltimore, MD
May 14, 1983
Contact:
Chesapeake Chapter, SPAAMFAA, 1301
York Rd.
Lutherville, MD 21093

Muster
Lake Muhlenberg
Allentown, PA
May 29, 1983
Contact:
Delaware Valley Chapter, SPAAMFAA

c/o Union Historical Fire Society
1307 N. 19th St.
Allentown, PA 18104

June
Massachusetts Antique Fire Apparatus Association Muster
Suntaug Lake Park
Lynnfield, MA
June 11, 1983
Contact:
James F. Dillon
P.O. Box 3332
Peabody, MA 01960

Crazy Days Muster
Milwaukie, OR
June 18 and 19, 1983
Sponsors:
Clackamas County Fire Fighters, City of Milwaukie, and City of Lake Oswego
Contact:
Keith Wolfard
(503) 631-8865

14th Annual Fairchester Antique Fire Apparatus Show and Muster
Croton Point Park
Croton-on-Hudson, NY
June 25, 1983
Sponsors:
Fairchester Hose Haulers Association
Contact:
Warren P. Lyon
462 River Ave.
Pelham, NY 10803

July
Scituate Fire Department Muster
Scituate, MA
early July, 1983
Contact:
Bart Curran
Fire Department Headquarters
149 First Parish Rd.
Scituate, MA 02066

Soddy-Daisy Muster
Daisy City Park
Daisy, TN
July 4th weekend - 1983
Sponsor:
Soddy-Daisy Fire Department
Contact:
Fred R. Duffy III
Tennessee State Fire School
1303 Old Fort Parkway
Murfreesboro, TN 37130

Pennsylvania Pump Primers Muster
(10 am to 4 pm)
River Front Park at Chestnut St.
Harrisburg, PA
July 9, 1983
Sponsor:
PA Pump Primers
Contact:
Elois D. Cocklin
P.O. Box 3785
Harrisburg, PA 17105

Fireman's Muster
Florence, OR
July 23 and 24, 1983
Sponsor:
Florence Fire Department Muster Team
Contact:
Clyde Miller
(503) 997-3296

August
Muster and Silver Anniversary National Convention
SPAAMFAA
Sheraton Motor Inn
Liverpool, NY
Aug. 5 and 6, 1983
Sponsors:
Central New York Chapter of SPAAMFAA, and Onondaga County Parks and Recreation Department
Contact:
Peter [illegible]. DeSalvo
P.O. Box 2433
Syracuse, NY 13220

12th Annual Muster
Oeder's Lake
State Rte. 22
Morrow, OH
Aug. 13, 1983
Sponsor:
Miles Greenwood Historical Fire Apparatus Society of Southern Ohio
Contact:
Howard W. Kuhnell, Jr.
605 Garfield Ave.
Milford, OH 45150

Rowley Fire Department Muster
Rowley Common, MA
Aug. 13, 1983 (tentative)
Contact:
Rowley Fire Department
P.O. Box 281
Rowley, MA 01969

Fireman's Muster
West Salem, OR
Aug. 13 and 14, 1983
Sponsor:
Capital #1 Muster Team
Salem Fire Department
Contact:
Dan Joynt
(503) 585-9438

Bon-de-Croft Muster
Bon-Air Elementary School
Sparta, TN
Aug. 14, 1983
Sponsor:
Bon-de-Croft Volunteer
Fire Department
Contact:
Fred R. Duffy III
Tennessee State Fire School
1303 Old Fort Parkway
Murfreesboro, TN 37130

Fifth Annual Fire Apparatus Parade, Show and Muster
Byrd Lake Park
Richmond, VA
Aug. 20, 1983
Sponsor:
Old Dominion Historical Fire Society
Contact:
Thomas L. Herman
P.O. Box 34196
Richmond, VA 23234

Wheaton Village Muster III
Millville, NJ
Aug. 21, 1983
Contact:
James Mulch
Glasstown Antique Fire
Brigade
120 Woodland Ave.
Pitman, NJ 08071

September

Second Annual Cookeville Firefighting Competition
Fire Station #2
Cookeville, TN
Sept. 18, 1983
Sponsors:
Cookeville Fire Department and
City of Cookeville
Contact:
Fred R. Duffy III
Tennessee State Fire School
1303 Old Fort Parkway
Murfreesboro, TN 37130

October

Tennessee Firefighting Competition
Nashville Fire Department Training
Center
Nashville, TN
Oct. 1 and 2, 1983
Sponsor:
Tennessee Firefighters Competition
Association
Contact:
Fred R. Duffy III
Tennessee State Fire School
1303 Old Fort Parkway
Murfreesboro, TN 37130

November

Fall Muster, Florida Antique Bucket Brigade
Tropical Park
Palmetto Expressway and SW 40 St.
Miami, FL
Nov. 12, 1983
Contact:
Gary Rorabacher
1514 W. Palm Circle
Valrico, FL 33594

NOTE: NFPA expresses special thanks for contributions to this listing from chapters throughout the country of SPAAMFAA — the Society for the Preservation and Appreciation of Antique Motor Fire Apparatus in America. The mailing address for Society headquarters is: P.O. Box 450, Eastwood Station, Syracuse, NY 13206. If you would like your muster listed in the *1984 Fire Almanac* calendar of musters, send the name, date, and place of the muster; the name of the sponsoring organization; and the name, address, and phone number of the person to contact for more information to: Editor, *Fire Almanac*, NFPA, Batterymarch Park, Quincy, MA 02269.

TYPICAL MEDICAL GAS CYLINDERS VOLUME AND WEIGHT OF AVAILABLE CONTENTS*

All Volumes at 70 F. (21.1 C)

Cylinder Style & Dimensions	Nominal Volume Cu In/Liter	Contents	NAME OF GAS								
			Air	Carbon Dioxide	Cyclo-Propane	Helium	Nitrogen	Nitrous Oxide	Oxygen	Mixtures of Oxygen	
										Helium	CO,
B 3½" od x 13" 8.89 x 33 cm	87/1.43	psig Liters Lbs.-Oz. Kilograms		838 370 1 - 8 .68	75 375 1 - 7¼ .66				1900 200 — —		
D 4½" od x 17" 10.8 x 43 cm	176/2.88	psig Liters Lbs.-Oz. Kilograms	1900 375 — —	838 940 3 - 13 1.73	75 870 3 - 5½ 1.51	1600 300 — —	1900 370 — —	745 940 3 - 13 1.73	1900 400 — —	** 300 ** **	** 400 ** **
E 4¼" od x 26" 10.8 x 66 cm	293/4.80	psig Liters Lbs.-Oz. Kilograms	1900 625 — —	838 1,590 6 - 7 2.92		1600 500 — —	1900 610 — —	745 1,590 6 - 7 2.92	1900 660 — —	** 500 ** **	** 660 ** **
M [illegible] od x 43" 1[illegible].8 x 109 cm	1337/21.9	psig Liters Lbs.-Oz. Kilograms	1900 2850 — —	838 7,570 30 - 10 13.9		1600 2260 — —	2200 3200 — —	7.45 7,570 30 - 10 13.9	2200 3450 122 cuft —	** 2260 ** **	** 3000 ** **
G 8½" od x 51" 21.6 x 130 cm	2370/38.8	psig Liters Lbs.-Oz. Kilograms	1900 5050 — —	838 12,300 50 - 0 22.7		1600 4000 — —		745 13,800 56 - 0 25.4		** 4000 ** **	** 5330 ** **
H or K 9¼" od x 51" 23.5 x 130 cm	2660/43.6	psig Liters Lbs.-Oz. Kilograms	2200 6550 — —			2200 6000 — —	2200 6400 — —	745 15,800 64 29.1	2200† 6900 244 cuft —		

NOTES: (*) These are computed contents based on nominal cylinder volumes and rounded to no greater variance than ±1%.

(**) The pressure and weight of mixed gases will vary according to the composition of the mixture.

(†) 275 cu. ft./7800 liter cylinders at 2490 psig are available upon request.

SAMPLES OF TYPICAL FIRE LOADS

Type of Room	Contents Fire Load psf	Standard Deviation psf
Living Room	3.9	1.13
Family Room	2.7	.65
Bedroom	4.3	1.15
Dining Room	3.6	1.02
Kitchen	3.2	.77
Hospital Patient Room	1.2	.36
Nursing Home Patient Room	2.6	.62

COLOR OF FLAME/TEMPERATURE

The color of smoke becomes darker with the presence of more hydrocarbons (gasoline, oil, etc.). The color of flame varies from red to yellow to white (colorless) with an increase in temperature.

Temperature	Color	Temperature	Color
900°F	Faint red	1650°F	Salmon
1050°F	Blood red	1725°F	Orange
1175°F	Dark cherry	1825°F	Lemon
1250°F	Medium cherry	1975°F	Light yellow
1375°F	Cherry	2200°F	White
1550°F	Bright red	2550°F	Blue white

5-Year Chronological Calendar 1980-1984

1980

JANUARY

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
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FEBRUARY

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FEBRUARY

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JANUARY

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DECEMBER

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JANUARY

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FEBRUARY

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APRIL

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NOVEMBER

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DECEMBER

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State Laws Governing Fireworks

The following table details current state laws governing the sale and use of Common (Class C) Fireworks, as these are defined by the U.S. Department of Transportation in Title 49, Code of Federal Regulations, Part 173.88. Permit requirements for public fireworks displays are also shown.

The level of control for each state is listed according to the following categories:

I — States which *ban* the sale and use of *all* Common Fireworks. (14)
II — States which only allow the sale and use of sparklers and "toy snakes." ("S" denotes sparklers only; "SS" denotes both sparklers and snakes.) (10)
III — States which allow the sale and use of only those common fireworks specifically defined by state law. (10 plus DC)
IV — States which allow the sale and use of only those common fireworks specifically approved by the enforcing authority of the state. (6)
V — States which allow the sale and use of all common fireworks. (8)
VI — States which have no fireworks control laws, except at county level. (2)

In addition to the above information, it would be noted that municipalities may have stricter laws.

Kentucky requires sparklers and snakes to be approved by the state fire marshal.

Licensing requirements in Nevada and Hawaii are at the county level, not state level.

State	Control Category	Allowed Sales Period	License for Sale	Public Display Permit
Alabama	V	6-25 to 7-5 12-15 to 1-1	None	SFM
Alaska	V	All Year	Wholesale/Retail	SFM
Arizona	I	—	—	Local
Arkansas	V	6-20 to 7-10 12-10 to 1-15	Wholesale/Retail	State Police
California	IV	6-28 to 7-6	Wholesale/Retail	SFM/Local
Colorado	II S	All Year	None	Local
Connecticut	I	—	Wholesale	SFM/Local
Delaware	I	—	—	DPS
District of Columbia	III	All Year	Wholesale/Retail	Fire Chief
Florida	II S	All Year	None	Local
Georgia	I	—	—	County
Hawaii	VI	All Year	Wholesale/Retail (County)	Local
Idaho	III	6-15 to 7-5	None	Local
Illinois	II S	All Year	?	Local
Indiana	III	All Year	None	SFM
Iowa	II SS	All Year	None	Local
Kansas	IV	6-27 to 7-5	None	Local
Kentucky	IV	All Year	—	Local
Louisiana	V	6-25 to 7-5 12-15 to 1-1	Wholesale/Retail	Local
Maine	II S	All Year	?	DPS
Maryland	II S	All Year	None	SFM
Massachusetts	I	—	—	Local
Michigan	III	All Year	None	Local
Minnesota	I	—	—	Local

State	Control Category	Allowed Sales Period	License for Sale	Public Display Permit
Mississippi	V	6-15 to 7-5 12-5 to 1-2	None	Local
Missouri	V	6-20 to 7-10 12-10 to 1-5	None	Local
Montana	III	6-24 to 7-5	None	SFM/Local
Nebraska	IV	6-25 to 7-4	Wholesale/Retail	SFM
Nevada	VI	All Year	Wholesale/Retail (County)	County
New Hampshire	I	—	—	Local
New Jersey	I	—	—	Local
New Mexico	IV	All Year	None	Local
New York	I	—	—	Local
North Carolina	I	—	—	County
North Dakota	III	6-27 to 7-5	Wholesale/Retail	Local
Ohio	I	—	—	Local
Oklahoma	III	6-15 to 7-6 12-15 to 1-2	Wholesale/Retail	SFM
Oregon	II SS	All Year	Wholesale/Retail	SFM/Local
Pennsylvania	II S	All Year	None	Local
Rhode Island	I	—	—	Local
South Carolina	III	All Year	Wholesale/Retail	Local
South Dakota	V	6-27 to 7-5	Wholesale/Retail	Local
Tennessee	V	6-20 to 7-5 12-10 to 1-2	Wholesale/Retail	SFM
Texas	III	6-24 to 7-4 12-15 to 1-1	Wholesale/Retail	SFM
Utah	II S	All Year	None	Local
Vermont	I	—	—	Local
Virginia	III	All Year	None	Local
Washington	IV	6-28 to 7-6	Wholesale/Retail	Local/SFM
West Virginia	I	—	—	SFM/Local
Wisconsin	II SS	All Year	None	Local
Wyoming	III	All Year	None	Local

Notes: SFM – State Fire Marshal; ? – No information available; DPS – Dept of Public Safety; — – Does not apply

Fireworks Incidents

Each year, hundreds of persons are victims of fireworks through injuries, damage to property, and even death. Review of fire reports and fire experience data have shown that the majority of injuries due to fireworks occur to persons under the age of 19; males were more frequently the victims of these incidents. (See "Fireworks Incidents: The 1978 Story," *Fire Journal*, November 1978, Vol. 72, No. 6, p. 58.)

Devices such as bottle rockets, cherry bombs, M-80s, homemade bombs, firecrackers, even toy caps when used improperly or without supervision can cause serious injury and even death to the user of fireworks or to an innocent bystander. Many have suffered second- and third-degree burns to the body, partial or total loss of sight, loss of hearing, dismemberment of fingers, loss of hands, etc.

The causes of fireworks incidents are varied: malfunctioning devices, children playing with fireworks without adult supervision; improper storage of fireworks; placement of fireworks inside glass bottles and other containers; fireworks landing on roofs, especially those constructed of wood shingles; and, an overall ignorance of the destructive and harmful capabilities of fireworks to self and others.

SELECTED FIREWORKS INCIDENTS 1978-82

Date	Location	Deaths	Injuries	Property Loss	Description
3/17/78	Wilmette, IL	1	9	$4,000,000	Several explosions in a clandestine fireworks factory.
6/5/79	Santa Clara County, CA	1			Fire caused by teenage boys discharging M-80 type fireworks, apparently igniting ground cover.
6/7/79	Walnut Creek, CA			$300,000	Grass fire caused by boys playing with firecrackers; high winds carried fire to nearby homes.
6/30/79	Bolingbrook, IL		2		Spark apparently dropped into open box of unused fireworks, igniting them.
7/3/79	Philadelphia, PA	3	7		Illegal fireworks factory in basement of duplex home exploded.
7/4/79	Oskaloosa, IA	1	14		Aerial device at public fireworks display failed to reach a safe height and fell into crowd before exploding.
7/4/79	Fresno, CA		1	$218,000	Bottle rockets landed on wooden roofing materials near motel, igniting them.
7/4/79	Kansas City, MO			$75,000	Bottle rocket apparently ignited wood-shingled roof of single-family dwelling.
7/4/79	Denton, TX			$50,000	Bottle rocket ignited wood-shingled roof of residence.
7/5/79	Everett, WA		1		Sparkler apparently ignited clothing.
7/5/79	Buffalo, IA		1		Lit sparkler placed into bag of fireworks caused explosion.
7/17/79	Delafield, WI			$200,000	Fireworks device set off by child playing in apartment building ignited straw on floor of building.
6/80	Laramie, WY	3			Explosion in an apparently illegal fireworks-manufacturing operation.
7/80	Texas			$933,000	Fireworks ignited wood-shingled roof in apartment complex.
7/30/80	San Diego, CA	3			Explosion at naval installation while confiscated fireworks were being moved from a munitions bunker to a pickup truck.
12/80	California		4		Sparkler ignited branch of Christmas tree during ceremony.
4/2/81	Newport, KY	2	27		Explosion in building apparently used to make or store fireworks.
1/1/82	Tupelo, MS	1			Fireworks thrown by child from car ignited in car.
5/31/82	Gratiot County, MI	2		$10,500	Materials apparently used to make fireworks exploded and touched off a fire in a garage.
6/28/82	Washington, DC		6		String of firecrackers exploded in shopping bag full of beer bottles, spraying glass throughout a crowded bus.

Date	Location	Deaths	Injuries	Property Loss	Description
6/29/82	New Bedford, MA		1		Child threw firecracker at another child.
6/30/82	Omaha, NE		1		Person injured attempting to turn over firecracker that was already burning.
7/2/82	Omaha, NE		1		Person hit by bottle rocket.
7/3/82	Quincy, MA		1		Child hit by fireworks.
7/3/82	Omaha, NE		1		Person standing over firecracker when it exploded.
7/3/82	Cookeville, TN		1		Roman candle exploded in person's right hand.
7/4/82	Carter Lake, IA		1		Rocket exploded while being lit by lighter.
7/4/82	Kansas City, MO		1		Firecracker went off before being released from hand.
7/4/82	Boston, MA		1		Lit firecracker exploded, sending small rock into eye.
7/4/82	Somerville, MA		1		Bottle rocket struck person after being pointed at him.
7/4/82	Woodbridge, VA		1		Second-degree burns to hand after matches ignited while lighting sparklers.
7/4/82	Lakewood, OH		24		Fireworks stored for a major display exploded; sparks from an opening salute during Fourth of July celebration ignited other fireworks.
7/4/82	Port Jefferson, NY		1	$30,000	Bottle rocket thrown into gas tank in garage.
7/5/82	Pyramid Lake, NV	1			Explosion from fireworks bomb that victim found and lit.
8/10/82	Seabrook, NH	4			Explosion in fireworks manufacturing plant.

Where To Find Out More

References and Other Sources

The selected publications listed below will provide the reader with additional information about many of the subjects covered in the *1983 Fire Almanac*.

The most general reference available on fire protection and prevention is the NFPA's *Fire Protection Handbook*, 15th edition.

Sources of information on U.S. federal agencies are: *Catalog of Federal Domestic Assistance*, *Commerce Business Daily*, *Congressional Record* and Federal Register. For information on these and practically all subjects write: Superintendent of Documents, Washington, DC 20402.

U.S. government research reports can be obtained from the following: HUD USER, P.O. Box 280, Germantown, MD 20767 (301) 251-5154; National Technical Information Service (NTIS), 5285 Port Royal Rd., Springfield, VA 22161 (703) 487-4650; Government Printing Office - Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402; Project Share: A National Clearinghouse for Improving Management of Human Services, P.O. Box 2309, Rockville, MD 20852 (301) 428-3100; Smithsonian Institution Science Information Exchange, 1730 M St., NW, Room 300, Washington, DC 20036 (202) 634-3933; National Criminal Justice Reference Service, Box 6000, Rockville, MD 20850 (301) 251-5500. All of the above organizations excluding the Government Printing Office will conduct computerized literature searches.

Specific References

Accident Prevention Manual for Industrial Operations (National Safety Council)
America Burning - National Commission on Fire Prevention and Control (U.S. Government Printing Office)
American Firehouse, An Architectural and Social History, The (Abbeville Press, Inc.)
Arson Investigation (Macmillan)
Computerized Approach for Identifying Cost-Effective Fire Safety Retrofits in Health Care Facilities, A (National Bureau of Standards, U.S. Dept. of Commerce)
Dangerous Properties of Industrial Materials (Van Nostrand Reinhold Company)
Educational Programs and Materials in Burn Care (American Burn Association)
Electrical Instruments in Hazardous Locations (Instrument Society of America)
Emergency Care (R.J. Brady)
Fire Aboard: The Problems of Prevention and Control in Ships, Port Installations and Offshore Structures (Simmons-Boardman Publishing Corp.)
Fire and Arson Investigation (Investigations Institute)
Fire Chief's Handbook (Fire Engineering)
Fire Fighting/Principles & Practices (Dun Donnelly Publishing Corp.)
Fire Department Deployment Analysis (North Holland)
Fire Loss Control: A Management Guide (Marcel Dekker, Inc.)
Fire Prevention (Nelson-Hall Chicago)
Firefighting in America, Dennis Smith's History of (The Dial Press)
Flammable Hazardous Materials (Glencoe Press Fire Science Series)
Forest Fire: Control and Use (McGraw-Hill)
Hazardous Material Spills, Control of (AICHE)
Hazardous Materials Guide (J. J. Keller & Associates, Inc.)
Hazardous Waste Management Guide (J.J. Keller & Associates, Inc.)
Hazardous Waste Regulatory Guide (J.J. Keller & Associates, Inc.)
Hazardous Waste Services Directory (J.J. Keller & Associates, Inc.)
Industrial Explosion Prevention and Protection (McGraw-Hill)
Municipal Year Book 1982, The (International City Management Association)
150 Years "From Buckets to Diesels" (27-33 Publicity Committee)
Reactive Chemical Hazards, Handbook of (Butterworths)
Residential Smoke and Fire Detector Coverage in the U.S.: Findings from a 1982 Survey (NTIS PB 83118885)
Safety Directory, Best's (1979) Vols I and II (A. M. Best Co.)
Uniform Fire Code Standards (International Conference of Building Officials)

The following publications are available from the National Fire Protection Association, Publications Sales Division, Batterymarch Park, Quincy, MA 02269.

Bulletin of the Conference of Fire Protection Associations
Chemicals for Forest Fire Fighting
Emergency Medical Services
Emergency Medical Services for Fire Departments
Fire Brigade Training Manual
Fire Journal®
Fire in America
Fire Prevention Planning & Leadership for Small Communities
Fire Protection Guide on Hazardous Materials
Fire Protection Reference Directory
Fire Service and the Law
Fire Service Today®
Fire Technology®
Fire Terms

Flammable and Combustible Liquids Code Handbook
Industrial Fire Hazards Handbook
Introduction to Fire Protection Law
Learn Not To Burn Curriculum
Legal Insight: Court Decisions Affecting Paid and Volunteer Fire Officers and Fire Fighters
Life Safety Code® Handbook
Management in the Fire Service
National Electrical Code® Handbook, The
National Fire Codes®
NFPA Washington Report, The
SCBA - A Fire Service Guide to the Selection, Use, Care and Maintenance of Self-Contained Breathing Apparatus
Technical Bulletin About Fire
Telecommunications Systems Principles & Practices for Rural and Forestry Service

Melting, Boiling, and Ignition Temperatures of Pure Metals in Solid Form

(Because of the variations in available information, the values given must be considered as being approximate and for guidance only. Generally, if a metal melts and flows before burning, an ignition temperature can be determined. Values were obtained from publications shown in the Bibliography.)

	Temperature °F.		
Pure Metal	Melting Point	Boiling Point	Solid Metal Ignition
Aluminum	1,220	4,445	above 1832*
Barium	1,337	2,084	347*
Calcium	1,548	2,625	1,300
Hafnium	4,032	9,750	—
Iron	2,795	5,432	1,706*
Lithium	367	2,437	356
Magnesium	1,202	2,030	1,153
Plutonium	1,184	6,000	1,112
Potassium	144	1,400	156*S
Sodium	208	1,616	above 239
Strontium	1,425	2,102	1,328*
Thorium	3,353	8,132	932*
Titanium	3,140	5,900	2,900
Uranium	2,070	6,900	below 6900
Zinc	786	1,665	1,652*
Zirconium	3,326	6,470	2,552*

* Ignition in oxygen
S Spontaneous ignition in moist air

Standard Gages for Sheet Metal and Wire

American Institute of Steel Construction, Inc.

Name of Gage	United States Standard Gage*		The United States Steel Wire Gage	American or Brown & Sharpe Wire Gage	New Birmingham Standard Sheet & Hoop Gage	British Imperial or English Legal Standard Wire Gage	Birmingham or Stubs Iron Wire Gage
Principal Use	Uncoated Steel Sheets and Light Plates		Steel Wire except Music Wire	Nonferrous Sheets and Wire	Iron and Steel Sheets and Hoops	Wire	Strips, Bands, Hoops and Wire
Gage No.	Weight (oz per sq ft)	Approx. Thickness (inches)	Thickness (inches)				
7/0's			0.4900		0.6666	0.500	
6/0's			0.4615	0.5800	0.6250	0.464	
5/0's			0.4305	0.5165	0.5883	0.432	0.500
4/0's			0.3938	0.4600	0.5416	0.400	0.454
3/0's			0.3625	0.4096	0.5000	0.372	0.425
2/0's			0.3310	0.3648	0.4452	0.348	0.380
0			0.3065	0.3249	0.3964	0.324	0.340
1			0.2830	0.2893	0.3532	0.300	0.300
2			0.2625	0.2576	0.3147	0.276	0.284
3	160	0.2391	0.2437	0.2294	0.2804	0.252	0.259
4	150	0.2242	0.2253	0.2043	0.2500	0.232	0.238
5	140	0.2092	0.2070	0.1819	0.2225	0.212	0.220
6	130	0.1943	0.1920	0.1620	0.1981	0.192	0.203
7	120	0.1793	0.1770	0.1443	0.1764	0.176	0.180
8	110	0.1644	0.1620	0.1285	0.1570	0.160	0.165
9	100	0.1495	0.1483	0.1144	0.1398	0.144	0.148
10	90	0.1345	0.1350	0.1019	0.1250	0.128	0.134
11	80	0.1196	0.1205	0.0907	0.1113	0.116	0.120
12	70	0.1046	0.1055	0.0808	0.0991	0.104	0.109
13	60	0.0897	0.0915	0.0720	0.0882	0.092	0.095
14	50	0.0747	0.0800	0.0641	0.0785	0.080	0.083
15	45	0.0673	0.0720	0.0571	0.0699	0.072	0.072
16	40	0.0598	0.0625	0.0508	0.0625	0.064	0.065
17	36	0.0538	0.0540	0.0453	0.0556	0.056	0.058

18	32	0.0478	0.0475	0.0403	0.0495	0.048	0.049
19	28	0.0418	0.0410	0.0359	0.0440	0.040	0.042
20	24	0.0359	0.0348	0.0320	0.0392	0.036	0.035
21	22	0.0329	0.0318	0.0285	0.0349	0.032	0.032
22	20	0.0299	0.0286	0.0253	0.0313	0.028	0.028
23	18	0.0269	0.0258	0.0226	0.0278	0.024	0.025
24	16	0.0239	0.0230	0.0201	0.0248	0.022	0.022
25	14	0.0209	0.0204	0.0179	0.0220	0.020	0.020
26	12	0.0179	0.0181	0.0159	0.0196	0.018	0.018
27	11	0.0164	0.0173	0.0142	0.0175	0.0164	0.016
28	10	0.0149	0.0162	0.0126	0.0156	0.0148	0.014
29	9	0.0135	0.0150	0.0113	0.0139	0.0136	0.013
30	8	0.0120	0.0140	0.0100	0.0123	0.0124	0.012
31	7	0.0105	0.0132	0.0089	0.0110	0.0116	0.010
32	6.5	0.0097	0.0128	0.0080	0.0098	0.0108	0.009
33	6	0.0090	0.0118	0.0071	0.0087	0.0100	0.008
34	5.5	0.0082	0.0104	0.0063	0.0077	0.0092	0.007
35	5	0.0075	0.0095	0.0056	0.0069	0.0084	0.005
36	4.5	0.0067	0.0090	0.0050	0.0061	0.0076	0.004
37	4.25	0.0064	0.0085	0.0045	0.0054	0.0068	
38	4	0.0060	0.0080	0.0040	0.0048	0.0060	
39			0.0075	0.0035	0.0043	0.0052	
40			0.0070	0.0031	0.0039	0.0048	

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* U.S. Standard Gage is officially a weight gage, in oz per sq ft as tabulated. The Approx. Thickness shown is the "Manufacturers' Standard" of the American Iron and Steel Institute, based on steel as weighing 501.81 lbs per cu ft (489.6 true weight plus 2.5 percent for average over-run in area and thickness). The A.I.S.I. standard nomenclature for flat rolled carbon steel is as follows:

Widths, Inches	Thicknesses, Inch							
	0.2500 and thicker	0.2499 to 0.2031	0.2030 to 0.1875	0.1874 to 0.0568	0.0567 to 0.0344	0.0343 to 0.0255	0.0254 to 0.0142	0.0141 and thinner
To 3½ incl.	Bar	Bar	Strip	Strip	Strip	Strip	Sheet	Sheet
Over 3½ to 6 incl.	Bar	Bar	Strip	Strip	Strip	Sheet	Sheet	Sheet
Over 6 to 12 incl.	Plate	Strip	Strip	Strip	Sheet	Sheet	Sheet	Sheet
Over 12 to 32 incl.	Plate	Sheet	Sheet	Sheet	Sheet	Sheet	Sheet	Black Plate
Over 32 to 48 incl.	Plate	Sheet	Sheet	Sheet	Sheet	Sheet	Sheet	Sheet
Over 48	Plate	Plate	Plate	Sheet	Sheet	Sheet	Sheet	—

Capacity of Cylinders or Cylindrical Tanks

U.S. Gallons and Barrels (Petroleum) per Foot of Length or Height

Capacity per foot, U.S. gallons = $\frac{\pi D^2}{4} \times 7.481$

D = Inside diameter in feet

For capacity in barrels (petroleum), divide by 42

Diameter, ft	Capacity per ft Gals	Capacity per ft Bbls	Diameter, ft	Capacity per ft Gals	Capacity per ft Bbls	Diameter, ft	Capacity per ft Gals	Capacity per ft Bbls
1	5.8751	0.13989	51	15277.3	363.826	101	59932.6	1426.91
2	23.5007	0.55981	52	15883.9	378.235	102	61125.3	1455.30
3	52.8766	1.258	53	16503.3	392.921	103	62329.7	1483.98
4	94.0029	2.2389	54	17131.9	407.888	104	63549.5	1512.94
5	146.879	3.49699	55	17792.4	423.135	105	64773.7	1542.17
6	211.506	5.03565	56	18424.5	438.662	106	66013.4	1571.68
7	287.883	6.85409	57	19088.4	454.468	107	67264.8	1601.48
8	376.011	8.95228	58	19764.1	470.554	108	68528.0	1631.55
9	475.889	11.3302	59	20451.5	486.920	109	69802.9	1661.90
10	587.517	13.9879	60	21150.6	503.565	110	71089.5	1692.54
11	710.892	16.9254	61	21861.5	520.491	111	72387.9	1723.45
12	846.022	20.1425	62	22584.2	537.696	112	73698.1	1754.64
13	992.902	23.6396	63	23318.6	555.182	113	75019.7	1786.12
14	1151.53	27.4164	64	24064.7	572.946	114	76353.5	1817.87
15	1321.92	31.4729	65	24822.6	590.991	115	77699.2	1849.90
16	1504.04	35.8091	66	25592.2	609.314	116	79056.2	1882.21
17	1697.92	40.425	67	26373.6	627.918	117	80425.1	1914.80
18	1903.56	45.3209	68	27166.8	646.802	118	81805.9	1947.68
19	2120.94	50.4965	69	27971.7	665.966	119	83198.1	1980.83
20	2350.07	55.9517	70	28788.3	685.409	120	84602.2	2014.26

21	2590.95	61.6868	71	29616.7	705.132	121	86018.3	2047.97
22	2843.58	67.7016	72	30456.9	725.134	122	87438.8	2081.97
23	3107.89	73.9963	73	31308.8	745.418	123	88885.5	2116.24
24	3384.02	80.5704	74	32172.4	765.980	124	90261.9	2150.79
25	3671.98	87.4247	75	33047.8	786.821	125	91799.2	2185.61
26	3971.69	94.5584	76	33935.0	807.944	126	93274.4	2220.73
27	4283.00	101.972	77	34833.9	829.346	127	94760.7	2256.12
28	4606.13	109.665	78	35744.5	851.026	128	96259.1	2291.79
29	4941.02	117.638	79	36666.9	872.987	129	97768.6	2327.73
30	5286.36	125.891	80	37601.1	895.228	130	99290.2	2363.96
31	5646.04	134.424	81	38547.0	917.749	131	100824	2400.45
32	6016.18	143.237	82	39504.6	940.549	132	102369	2437.26
33	6398.06	152.328	83	40474.1	963.630	133	103927	2474.33
34	6791.70	161.701	84	41455.2	986.989	134	105495	2511.67
35	7197.09	171.352	85	42448.1	1010.63	135	107075	2549.31
36	7614.25	181.284	86	43452.7	1034.55	136	108667	2587.21
37	8043.11	191.494	87	44469.2	1058.75	137	110271	2625.33
38	8483.71	201.984	88	45497.3	1083.23	138	111887	2663.86
39	8936.13	212.756	89	46537.2	1107.99	139	113514	2702.61
40	9400.30	223.807	90	47588.9	1133.02	140	115153	2741.64
41	9876.13	235.136	91	48652.3	1158.34	141	116804	2780.94
42	10363.8	246.747	92	49727.4	1183.94	142	118467	2820.53
43	10863.2	258.636	93	50814.4	1209.82	143	120141	2860.39
44	11374.3	270.806	94	51913.1	1235.79	144	121827	2900.53
45	11897.2	283.256	95	53023.4	1262.41	145	123525	2940.97
46	12431.8	295.984	96	54145.6	1289.13	146	125235	2981.66
47	12978.2	308.992	97	55280.1	1316.14	147	126957	3022.66
48	13536.4	322.283	98	56425.1	1343.40	148	128690	3063.93
49	14106.3	335.850	99	57582.6	1370.96	149	130434	3105.46
50	14688.0	349.699	100	58751.7	1398.79	150	132192	3147.29

Sizes and Capacity of Steel Pipe

Nominal Pipe Size (inches)	Outside Diameter (inches)	Inside Diameter (inches)	Capacity of One Foot Length of Pipe		Nominal Pipe Size (inches)	Outside Diameter (inches)	Inside Diameter (inches)	Capacity of One Foot Length of Pipe	
			Cubic Feet	Gallons				Cubic Feet	Gallons
Schedule 40 Pipe					Schedule 80 Pipe				
½	0.840	0.622	0.0021	0.0158	½	0.840	0.546	0.0016	0.012
¾	1.050	0.824	0.0037	0.0276	¾	1.050	0.742	0.0030	0.022
1	1.315	1.049	0.0060	0.0449	1	1.315	0.957	0.0050	0.037
1¼	1.660	1.380	0.0104	0.0774	1¼	1.660	1.278	0.0089	0.066
1½	1.900	1.610	0.0142	0.106	1½	1.900	1.500	0.0123	0.092
2	2.375	2.067	0.0233	0.174	2	2.375	1.939	0.0205	0.153
2½	2.875	2.469	0.0332	0.248	2½	2.875	2.323	0.0294	0.220
3	3.500	3.068	0.0513	0.383	3	3.500	2.900	0.0548	0.344
3½	4.000	3.548	0.0686	0.513	3½	4.000	3.364	0.0617	0.458
4	4.500	4.026	0.0883	0.660	4	4.500	3.826	0.0798	0.597
5	5.563	5.047	0.139	1.04	5	5.563	4.813	0.126	0.947
6	6.625	6.065	0.200	1.50	6	6.625	5.761	0.181	1.35
8	8.625	7.981	0.3474	2.60	8	8.625	7.625	0.3171	2.38
10	10.75	10.020	0.5475	4.10	10	10.75	9.564	0.4989	3.74
12	12.75	11.938	0.7773	5.82	12	12.75	11.376	0.7058	5.28
14	14.0	13.126	0.9397	7.03	14	14.0	12.500	0.8522	6.38
16	16.0	15.000	1.2272	9.16	16	16.0	14.314	1.1175	8.36
18	18.0	16.876	1.5533	11.61	18	18.0	16.126	1.4183	10.61
20	20.0	18.814	1.9305	14.44	20	20.0	17.938	1.7550	13.13
24	24.0	22.626	2.7920	20.87	24	24.0	21.564	2.536	19.0

Average Amounts of Combustibles Per Sq Ft of Floor Area

(Contents, finished flooring, interior finish, and trim)*

Occupancy	Percent of Total Floor Area	Range of Combustible Contents, lbs per sq ft	Occupancy	Percent of Total Floor Area	Range of Combustible Contents, lbs per sq ft

Printing plant	36.7 27.8 35.5	0.0– 14.9 15.0– 49.9 50.0–100 +
Newspaper plant	67.6 30.2 2.2	0.0– 14.9 15.0– 49.9 50.0–100
Department store A	12.6 76.6 10.8	0.0– 4.9 5.0– 14.9 15.0– 40 +
Department store B	7.8 78.4 13.8	0.0– 4.9 5.0– 14.9 15.0– 40 +
Clothing factory A	35.3 53.6 11.1	0.0– 9.9 10.0– 14.9 15.0– 30
Clothing factory B	85.7 5.7 8.6	0.0– 9.9 10.0– 14.9 15.0– 40
Mattress factory A	10.8 67.1 22.1	0.0– 4.9 5.0– 14.9 15.0– 50
Mattress factory B	7.9 46.3 45.8	0.0– 4.9 5.0– 14.9 15.0–100 +
Furniture factory A	1.5 81.4 17.1	0.0– 9.9 10.0– 29.9 30.0– 65 +
Furniture factory B	54.7 37.3 8.0	0.0– 9.9 10.0– 29.9 30.0– 65 +
Warehouse A	86.3 13.7	0.0– 29.9 30.0– 75
Warehouse B	18.1 50.9 31.0	0.0– 29.9 30.0– 74.9 75.0–257
Elementary school A (public)	99.2 0.8	0.0– 14.9 15.0– 75
Elementary school B (public)	100.0	0.0– 15
High school A (public)	66.4 25.4 8.2	0.0– 4.9 5.0– 9.9 10.0–288†
High school B (public)	32.6 64.1 3.3	0.0– 4.9 5.0– 9.9 10.0–256‡
Offices	59.2 19.2 21.6	0.0– 14.9 15.0– 29.9 30.0– 86
Hospital (medical and surgical building)	82.1 17.0 .9	0.0– 4.9 5.0– 14.9 15.0– 20 +
Apartments (average of 13 units)	100.0	10.0

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* Data from National Bureau of Standards. BMS 92 (1942) and BMS 149 (1957).

† Includes fire loading for storage areas: 25 percent of floor area ranging from 25 to 100 lbs per sq ft (general storage) and 0.2 percent at 288 lbs per sq ft (textbook storage).

‡ Includes 0.3 percent of floor area at 256 lbs per sq ft (textbook storage).

PROPERTIES OF MATERIALS

	Flash Point °F	Ignition Temperature °F	Melting Point °F
Wood			
Western red cedar		378	
White pine		507	
White oak		410	
Paper birch		399	
Spruce		502	
Douglas fir		500	
Paper			
Newsprint		466	
Plastics			
Cellulose Acetate		698-824	
Polyvinylchloride (PVC)		752-1220	
Polyurethane		734-1022	
Styrene		824-1040	
Fabrics			
Cotton		464	
Nylon		887	293-489
Rayon		536	
Wool		401	
Metals			
Aluminum			1220
Brass			1670-1900
Bronze			1290-1890
Cast iron			2000-2800
Chromium			2930
Copper			1981
Iron			2802
Lead			621
Magnesium			1203
Nickel			2651
Platinum			3224
Silver			1761
Solder			361-482
Stainless steel			2462-2822
Steel			2552-2882
Tin			449
Zinc			786
Flammable Liquids			
Ethyl alcohol	55	793	
Ethyl ether	-49	356	
Gasoline	-45	536	
Methyl alcohol	52	867	
Methyl ethyl ketone	21	960	
Naptha, Safety Solvent	138	453	
Napthalene	174	979	
Toluol	40	997	
Turpentine	95	488	
Xylene	81-90	867-984	

	Flash Point °F	Ignition Temperature °F	Melting Point °F
Flammable Gas			
Ammonia (Anhydrous)		1200	
Butane		761	
Carbon Monoxide		1128	
Hydrogen		932	
Hydrogen Sulfide		500	
Methane		999	
Natural gas		900-1170	
Propane		871	
Miscellaneous			
Asphalt	400+	905	
Cooking oil	395	833	
Paraffin Wax	390	473	120-167
Transformer oil	295		
Tallow	509		88-100
Antifreeze (Propylene Glycol)	210	790	
Kerosene	100	444	
Glass	Softens	2000-2100	1400-1600

NOTES:

at 600°F Wood ignites in 5 minutes
at 500°F Wood ignites in 10 minutes
at 425°F Wood ignites in 20 minutes
at 375°F Wood ignites in 30 minutes

Factors which affect the burning of wood are the intensity of the fire and the density of the wood. Hard woods will not char as deeply as softer woods under the same fire conditions and in the same amount of time. It is generally considered that most woods burning under normal circumstances will burn about 1 inch in depth in 45 minutes.

Miscellaneous Information

Unprotected steel fails at 1000°F to 1400°F. Heated to 1000°F, a steel member will expand 9 ½ inches in 100 feet of length.

Glass has no definite melting point, but softens between 1400°F-1600°F.

SMOKE AND FLAME COLOR

The colors of smoke and flame are subject to considerable variation, but the following tabulation, based on fire department experience, may prove helpful.

Combustible	Color of Smoke	Color of Flame
Wood	Gray to Brown	Red to Yellow
Paper	Gray to Brown	Red to Yellow
Cloth	Gray to Brown	Red to Yellow
Gasoline	Black	Red to White
Naphtha	Brown to Black	Straw to White
Benzine	White to Gray	Yellow to White
Lubricating Oil	Black	Dark Red to Orange-Yellow
Lacquer Thinner	Brownish Black	Red to Yellow
Turpentine	Black to Brown	Yellow to White
Acetone	Black	Blue White
Cooking Oil	Brown	Red to Yellow
Kerosene	Black	Dark Red to Orange-Yellow

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The National Fire Protection Association is a non-profit technical and educational organization. Its mission is to promote the science and improve the methods of fire protection and prevention; to obtain and circulate information on these subjects; to secure the cooperation of its members and the public in establishing proper safeguards against loss of life and property by fire.

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INVITATION TO THE READER

We hope you will find this *1984 Fire Almanac* to be a useful and handy one-stop reference for information about the fire protection field. We have tried to make this second edition as complete as possible, but we need your help to make the next edition of *The Fire Almanac* even more comprehensive.

If there is information or a subject that we did not include, but you would like to read about or know about, tell us what it is and we will try to include it. If you know something that should be included in this book, or have something interesting about the fire protection field that you want to contribute, please let us know. Write to: Editor, *Fire Almanac*, National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

We also want to know if a name, an address, or a telephone number has changed, if there is an upcoming event, a new program or course, or a new publication being offered. If you have more current information than is contained in this *Almanac*, or have found misinformation or major omissions, please let us know. We will be sure to correct the errors and provide what is missing in the next editions. We would also like to know what you liked most about *The 1984 Fire Almanac* and what you disliked or found unnecessary.

This *Almanac* is published *for you*—we want you to help make it as useful and as entertaining as possible. We look forward to sharing your ideas and information in future editions.

Year in Review

The Year in Review — As NFPA Saw It

As promised, we proudly bring you this Second Edition of the *Fire Almanac* for 1984. To put it mildly, our first *Almanac*, published in 1983, was a smashing success with a distribution far exceeding our expectations for a First Edition. An almanac is defined as an annual publication composed of various lists, charts, and tables of *useful* information. Useful it must have been because we have seen it quoted time and time again. Again for 1984 we have pulled together the most-asked-for information on firesafety; the "who's" and the "what's" of fire protection in the United States today. No almanac is ever complete, so we again enlist your support in helping us to "fill in the gaps" for next year's edition.

Dateline, September 1983. Firesafety trends again are somewhat encouraging in the United States as we look to the declining rate of fire deaths over the past several years. The last full year for which we have statistics, 1982, saw a significant decrease of 10.1 percent from the 1981 civilian fire death number, and the number of fires reported to fire departments also was down 12.3 percent. Dollar loss in fires in structures resulted in an estimated decrease of 4.1 percent. So all across the board there were significant decreases in 1982 from 1981. Even the number of incendiary and suspicious fires was down by 16.5 percent. Are these trends of such statistical significance that we can become optimistic?

Yes, say the NFPA statisticians as they point to the 21.9 percent decline in total civilian deaths during the period between 1978 and 1982 (5-year trends). For those of us dedicated to firesafety, however, there is no room for complacency. The United States still leads most industrialized nations in the highest death rate per million population. Most of the United States deaths (96.2 percent or an annual average of 5,575 deaths) occur in residential occupancies. In particular, fires in the home (one- and two-family dwellings and apartments) resulted in 93 percent of all structural fire deaths. Our biggest challenge, therefore, is preventing residential fire deaths. We believe the downward trend in fire deaths is due to a new awareness by the general public of the fire threat as well as to the widespread use of early warning smoke detection in the home. Today, according to a recent United States Fire Administration Study, over 60 percent of the households in the United States have smoke detectors. Many firesafety organizations at the national and local level are targeting the other 30 to 40 percent of the population, particularly in heavily congested urban areas and the sparsely populated rural communities, to try to find ways to encourage the installation, maintenance, and use of smoke detectors. Ironically, the largest communities (population of 500,000 or more) and the smallest (under 2,500 population) still experience the highest fire death rates.

So far in 1983 the fire in the United States with the worst loss of life occurred at the Cincinnati Airport on June 2 when an Air Canada DC-9 made an emergency landing while a fire was spreading throughout the passenger cabin. The airport crash rescue units made an immediate attack but it was too late for 23 passengers. This incident resulted in the United States Congress holding hearings on aircraft passenger firesafety and the U.S. Federal Aviation Administration being directed to take another look at the fire protection of aircraft interiors, especially fire resistant seats, finishes, and sealings as well as automatic fire detection and suppression systems. Ironically, earlier in the year, the FAA had proposed regulations to lower the requirements for crash fire rescue personnel at smaller airports.

News coverage of the September 1 Korean Airline Flight No. 007 tragedy all but obliterated the fact that on the day before, August 31, the second worst multiple-fatality fire of 1983 occurred in a facility designed for the mentally handicapped in Suwanee, Georgia. The dormitory building in which the fatalities occurred had been built less than ten years ago and yet over 50 percent of its occupants perished (8 out of the 15).

Earlier in the year, on April 19, a serious fire in a half-way house for de-institutionalized mental patients occurred in Worcester, Massachusetts, and resulted in seven fatalities and injuries to 26 persons. This converted, single-family dwelling is typical of many half-way houses and adult boarding homes that are being used for de-institutionalized patients and the elderly. Known by various names such as half-way houses, boarding homes, and rest homes, these facilities are springing up all over the country as a result of cutbacks in public funding of more traditional institutions and the desire to provide a transition for these citizens back into society. The fire problem presented by these facilities is reminiscent of the nursing home fire problems of the 1950s and 1960s which have largely been corrected through the combined efforts of the nursing home industry, federal government, state and local governments, and the uniform enforcement of NFPA's *Life Safety Code®* in these occupancies.

The downward trend in multiple-fatality hotel fires is encouraging in 1983. Several major hotel chains have embarked on retrofitting programs to install detection, extinguishment and containment systems in their properties. Automatic sprinkler systems are being retrofitted even where they are not required by local codes. The trends are encouraging but there are still many hotel facilities that remain vulnerable to multiple-fatality fires; witness the Ramada Inn Hotel fire of June 14 in Fort Worth, Texas, in which five guests lost their lives.

At least one state, Florida, has passed a law requiring certain public lodging establishments and timesharing facilities to be equipped with automatic sprinkler systems and smoke detectors. The new law covers hotels, motels, and timesharing facilities of three stories or more with interior corridors and applies to new as well as existing facilities. The law finally passed after 12 years before the legislature. Why? Because of Florida's tourist industry which in 1982 generated 39 million tourists and $21 billion dollars of revenue!

Wood shingle roofs were in the news and again contributed to the largest dollar loss fire reported to NFPA so far in 1983, on March 21 in Dallas, Texas. The Willow Creek Apartments consisted of 824 housing units and 64 buildings on a 42-acre site. The fire caused damage to approximately 125 of the apartment units in six separate buildings. The amount of the loss was $5,370,000 and was reminiscent of a similar complex which burned in 1982 in Houston, Texas. The hazard of untreated wood shingle roofs has been recognized by NFPA for decades, and numerous multi-million dollar conflagrations and group fires have occurred over the years.

Probably one of the most challenging fires in 1983 occurred on April 23 in Phoenix, Arizona, in a $50,000,000 high-rise office building. The fire occurred on the 10th floor and started in combustible materials used in an office refinishing operation that involved varnishes, paints, and paint strippers. Over 30 fire fighters were injured and 23 more went to the hospital for treatment or observation. The fire fighters had to carry all of their equipment (protective clothing, airpacks, and fire fighting gear) up the 10 flights of stairs, adding up to 125 pounds of extra weight for each fire fighter. The fire caused an estimated $3,500,000 loss, even though it was contained to the 10th floor.

The trend to low-cost, quick-response, retrofit sprinkler systems for one- and two-family dwellings continues to spread throughout the nation, particularly in those communities that are trying to hold down the cost of maintaining public fire departments. The latest area to adopt this technology is Cobb County, Georgia, one of the fastest growing counties in America, where 3,000 apartment and condominium units have been equipped with quick-response residential sprinkler systems. As we went to press, North Carolina was considering an amendment to its building code to allow for the quick-response sprinkler technology as a "tradeoff" for certain building code requirements for residential apartments.

Outside the U. S., what is believed to be the most serious loss-of-life tank fire in history occurred on December 19, 1982, in Tacoa, Venezuela, near Caracas. After six hours of intense burning, the contents of the tank erupted in a violent "boilover." More than 150 died, scores more were injured, and damage was estimated at $50 million. Forty of the fatalities were fire fighters.

And in Australia they called it Ash Wednesday, February 16, 1983, with the temperature above 40°C for the third day so far that month. Ironically, it was the religious holiday of Ash Wednesday and usually a 40°C-day occurs only once every five years. In Adelaide, the winds whipped up to over 100 kilometers per hour when the fires started, and before the week was over 74 lives were lost (the worst loss-of-life fire in Australia's history). More than 1,200 homes and nearly 1,300 farms were destroyed, over 800,000 hectares were burned, 6,000 kilometers of fencing was destroyed, 8,000 cattle and 400,000 sheep perished. Dollar losses, which in September 1983 had already amounted to hundreds of millions of dollars, are still being counted. The Ash Wednesday fire in Australia was perhaps the worst fire in the world in 1983 in terms of total destruction.

As we close out the 20th century in the remaining two decades, we are experiencing and will continue to experience certain political and financial constraints in the delivery of fire protection services in the United States. The "signs of the times" provide indicators for what we might expect in the future. While the pressures of inflation are driving the costs of fire protection ever upward, the American citizen has at the same time declared a tax revolt which has put a lid on government spending at all levels. The fire service and the fire protection community in America have no choice but to find more cost effective approaches to delivering firesafety to the public.

In the next twenty years, the fire service will be considering new, as well as time-proven steps to achieve these cost effective goals. There will be increased consolidation of fire departments and similar functions within municipalities. Functional consolidation will be much more widespread and will include central purchasing, central dispatching and alarm services, and the pooling of training, fire prevention and EMS services. An increase in the number of private contractors hired for fire prevention and fire suppression services to the municipalities and probably to the federal government could replace some of the more traditional governmental approachs to public safety. Better utilization of manpower, increased productivity, a cost conscious citizenry, and management hardened fire chiefs will be the watchwords of the next decade. There will be an increased awareness of the fire problem by all citizens and, consequently, an increased awareness of the cost burden created by the fire problem.

We see a more equitable distribution of the cost of public fire protection in the years to come so that the homeowner is not paying for the protection of high-rise buildings in his tax bill. Traditional tax exempt properties will be scrutinized to make sure that these institutions are paying their fair share for public services. All forms of new revenue sources will be explored by the fire service as they look towards alternative means to support their mission.

The closing decades of the 20th century will see the installation of automatic fire detection and suppression systems in office buildings, hotels, restaurants, and other commercial occupancies, both new and old, because the fire departments of the future will be even less able to provide the resources to combat fires in these structures.

WE WANT TO KNOW . . .

if a name, an address, or a phone number has changed; if there's an upcoming event, a new program or course, a new publication being offered. If you have more current information than is contained in this *Almanac*, know something that should be included in this book, or just have something interesting about the fire protection scene that you want to contribute, please let us know. Write: Editor, *Fire Almanac*, NFPA, Batterymarch Park, Quincy, MA 02269. All suggestions will receive our careful attention.

Significant Fires of 1982-83

Dorothy Mae Apartment Hotel

Los Angeles, California
September 4, 1982

On September 4, 1982, an early morning fire in the Dorothy Mae Apartment Hotel located in Los Angeles, California, resulted in the deaths of 24 occupants, critical injury to another, and assorted non-critical injuries to 32 other occupants and two fire fighters. The fire, reported to the fire department at 4:27 a.m., has been determined to be incendiary in origin by investigators of the Los Angeles City Fire Department Arson Investigation Unit. A 19-year old suspect was arrested and charged on December 23, 1982 with setting the fire. Most of the occupants in the apartment building were from a single town in Mexico and many were interrelated. Ten of the occupants who died in the fire were related to the suspect.

The fire was reportedly set in the second floor exit access corridor of the building. Fire and smoke were able to spread from the point of origin throughout two of the three exit access corridors because several fire doors in the north stairway were in the open position during the fire. Nineteen of the occupants who died in the fire were located in the north stairway on the second and third floor landings and in the third floor exit access corridor. They had been attempting to escape from the building when they were engulfed by flames as the fire "exploded" and enveloped the north stairway in flames.

The exact number of occupants present in the building at the time of the fire is not known; however, through their investigation, the fire department has determined that there were approximately 170 occupants in the building at the time of the fire. The fire department rescued more than 50 trapped occupants over ladders during the incident.

Factors contributing to the fatalities in this fire include:

- Location of the point of origin of the incendiary fire within an exit component.
- Use of a flammable liquid which provided a rapid and intense build-up of the fire.
- Presence of combustible plywood paneling on walls of the central exit access corridors which provided the fuel load for the continued growth and spread of the fire.
- Several fire doors in the north stairway that were blocked open and/or that had failed to be maintained.
- Delay in detection of the developing fire and subsequent notification, in a timely manner, of occupants.
- Delay in the notification of the fire department.

Perry's Domiciliary Care Home

Pittsburgh, Pennsylvania
October 28, 1982

On October 28, 1982, an incendiary fire in a three-story building being used as a boarding home in Pittsburgh, Pennsylvania, was responsible for the deaths of five of the occupants and serious injury to the one surviving occupant.

This occupancy provided domiciliary care to its elderly occupants. Domiciliary care provides a protected living arrangement in the community with some personal care services for adults who cannot live indepentently because of their social and economic situation yet do not require 24-hour institutional or nursing care. Such boarding homes are often located within a residential section of a community, typically in a large converted single-family dwelling, as this was, where room and board are provided.

The cause of the fire is considered by local investigative authorities to be incendiary.

The fire was apparently set on the carpeted floor at the base of the stairway and on the floor and furnishings within the dining room adjoining the stairway and front hallway using an unknown type and amount of accelerant. In addition to the flammable liquid, the fire may have originally involved hallway carpeting, and linoleum flooring and furnishings located in the dining room. The fire grew in intensity very rapidly.

The use of an accelerant and the location of the fire at the base of the open stairway most likely caused rapid deterioration of conditions in the stairway. Heat and products of combustion were most likely present on the stairway and landings on the upper floors even as the occupants became aware of the fire. Some of the occupants apparently attempted to escape by means of the single stairway. The owner and operator of the home was found on the first floor at the base of the stairs. Three occupants of the second floor were found in or on their beds. The occupant of the north bedroom of the second floor was found in bed. On the third floor, the fifth fatality was located in the hallway at the head of the stairs, indicating a probable escape attempt using the stairway.

It is known that smoke detector(s) operated; however, it is not known if the alarm they sounded was the first method of awareness. How or when the occupants of the building became aware of the fire was not determined.

Factors that contributed to the fatalities in this fire include:

- Rapid development of the fire due to its incendiary nature.
- Origin of the fire within the means of egress.
- An open stairway which allowed heat and products of combustion to quickly spread to the upper floors.
- Lack of a second means of egress from the upper floors of the building.

Harrison County Jail

Biloxi, Mississippi
November 8, 1982

An early morning fire in the Harrison County Jail in Biloxi, Mississippi, on November 8, 1982, was responsible for the deaths of 29 inmates and injury to 59 others, including inmates, jail officers, sheriff's deputies, police officers, and fire fighters. The fire, which was reported to the Biloxi Fire Department at 1:31 a.m., originated in an occupied isolation cell in the nonsprinklered jail facility. The isolation cell walls and door were padded with a sprayed-on rigid synthetic foam plastic material.

Jail officers became aware of the fire by hearing the cries of a single inmate being held in the isolation cell. The pass-through opening on the solid steel cell door was in the closed position. While approaching the cell in response to the inmate's alarm, the jailer smelled only a faint odor of smoke in the corridor. Upon opening the door of the cell, however, a ball of fire rolled out into the corridor. The cell door was blown open with such explosive force that the jail officer was thrown down the hall. The key ring with keys for unlocking each cell in the jail remained hanging on the door of the cell that was engulfed in fire.

As the fire vented into the corridor, dense black smoke immediately began to fill the corridor outside the cell of origin. Jail officers indicated that in a matter of only seconds, thick black smoke spread from that corridor through the wire and steel bars of the entry vestibule into the jail reception area. It is most likely that smoke also rapidly extended to all exit access corridors within the jail, making them untenable. Although the fire was confined to the cell of origin, the dense black smoke spread rapidly throughout the jail and trapped inmates in their cells. The jail officers' attempts to extinguish the fire and unlock cell doors to release inmates were hampered by the rapidly developing fire and spread of thick smoke in the jail corridors.

The sudden acceleration of the fire was most likely due to the introduction of oxygen as the door was opened. The padding material on the vertical surfaces of the cell was already well-involved before the cell door was opened. The occupant of the cell, who was able to "scamper from the cell on all fours" into the corridor, was most likely protected from the fire by lying on the floor under his mattress near the cell door.

According to statements by the jail officer, the alarm system in the jail was activated by the smoke detectors located in the corridor shortly after the door was opened and the fire flashed out into the corridor. In addition to sounding the alarm, the system also shut down the four roof-mounted air handling systems which provided conditioned air to most of the jail interior.

Major factors contributing to the fatalities and injuries in this fire include:

- Lack of detection and extinguishment of the fire in its incipient stage before it became life-threatening.
- The synthetic foam plastic cell padding material that, once ignited, created an intense fire characterized by a rapid rate of burning, high heat release, and a large amount of dense smoke.
- Lack of smoke barriers and compartmentation that allowed unrestricted spread of smoke throughout the jail.
- Inability of jail officers to effect rapid release of inmates in all cells in the confinement area.

Donaldson's Department Store

Minneapolis, Minnesota
November 25, 1982

In downtown Minneapolis, Minnesota, on Thanksgiving Day 1982, an incendiary fire that originated in combustible rubble from the demolition of a department store intensified rapidly and spread to the remaining section of the building, which was open to the outdoors at every floor. The resulting severe fire exposure to the adjoining 16-story bank building caused ignition on all floors of the bank building from the sixth to the top floor. A light court of the bank building appeared at act like a chimney, which increased the fire exposure to the high-rise building.

The properties involved in the Donaldson's Department Store/Northwestern National Bank fire were two separate, but adjoining building complexes that comprised one entire block in downtown Minneapolis.

The 16-story Northwestern National Bank of Minneapolis building occupied approximately 40 percent of the block and the five- to ten-story vacant Donaldson's Department Store occupied the remainder of the block. A new Donaldson's store was operating across Nicollet Mall to the west, and the old property (where the fire started) was being demolished.

Fire fighters had no access between the demolition operations and the exposed bank and so could not protect the bank building. They were unable to control the fire despite rapid response and the use of master stream appliances. Fire in the bank building spread from external exposure, not through interior vertical openings.

Twenty-four fire fighters were injured during suppression operations; no lives were lost. Damage to the top 11 bank building floors and to the undemolished portion of the department store building was severe. The estimated loss to the bank alone is between $91 million and $93 million.

The Minneapolis Arson Squad, Police, and the Bureau of Alcohol, Tobacco and Firearms of the US Treasury Department determined, after considerable investigation, that the fire had originated at ground level in debris and rubble resulting from the demolition process. The Minneapolis Fire Department has determined the cause of the fire to be arson. Unauthorized persons were known to have been on the premises on days preceeding the fire and on Thanksgiving Day.

Two juveniles were charged with second-degree arson a month after the fire and were

Demolition/Exposure Fire. (Courtesy *Minneapolis Star & Tribune*)

remanded to the juvenile court system. One was released on a technicality and charges against the other were dismissed.

Demolition operations that provided a bonfire configuration and the lack of security precautions during those operations are considered to be the major contributing factors to this loss. The fire illustrates the extreme exposure hazard of buildings undergoing demolition.

Tacoa Storage Tank

Caracas, Venezuela
December 19, 1982

What is believed to be the most serious loss-of-life tank fire in history occured on December 19, 1982 in Venezuela. The storage tank in Tacoa, a small seaside village a few miles northwest of Caracas, supplied fuel to an electric generating plant that provided power to Caracas's population of three million. Two workers died in the original ignition of the tank. During the early hours of the tank fire, a message was transmitted that the fire was considered contained and under control. Apparently, those in charge had decided that there was little possibility of achieving extinguishment and that the fire would burn itself out safely within the tank and dike. For all intents, the incident became a spectator fire. Media people were on-site to record the occurence. Fire fighters, civil defense personnel, and plant workers stood within 100 to 200 feet of the burning tank, while a handful of fire fighters operated a fixed monitor nozzle from the top of the dike.

After six hours of intense burning, the contents of the tank erupted in an extremely violent boilover which projected tank contents hundreds of feet into the air, forming a gaint fireball. Below, burning oil overflowed the dike. Those who were not killed instantly by the intense radiant heat were caught in a downhill flow of burning oil. More than 1000 feet away from the tank, some people jumped into the sea to escape the heat; it was reported that a few people drowned. The burning oil followed the roadway and contour of the land, flowing some 1300 feet away from the tank in spots. Nearby buildings, including approximately 70 occupied dwellings, ignited and burned. More than 60 vehicles were destroyed, including most of the fire apparatus on the scene. Several persons representing various media were among the fatalities, as were 17 plant employees. The boilover also claimed the lives of dozens of civil defense personnel and more than 40 uniformed fire fighters, making this incident the gravest of its kind in terms of loss of life of fire personnel.

Following the boilover of this tank, fire ignited in the dike enclosure around another tank 220 feet away. Heat from this fire apparently damaged gaskets and distorted joints in the piping of the second tank, resulting in a continuous supply of oil to the fire in the dike. Several hours later, this tank's roof opened at the seam and its contents ignited; this tank continued to burn for about two days. It did not experience a boilover, however, because its roof was never completely open. The tank shell folded in on itself while the contents burned, with the roof settling inside and sinking to the bottom and the outer tank shell finally standing only a few feet high. This is typical tank behavior in a fire when the roof is only partially open.

Hindsight provides us with two valuable lessons: (1) There is no justification for having large numbers of fire fighting personnel in the vicinity of a fire incident when they are not actively engaged in fire operations; and (2) Where it is known that a boilover liquid is being stored, tanks should not be situated at high elevations.

Oil Tank Boilover. (NFPA Photo)

Gasoline Storage Tank Explosion

Newark, New Jersey
January 7, 1983

Ignition of vapors from overflowing gasoline at a storage facility in Newark, New Jersey, caused several minor initial explosions, followed by a devastating explosion that resulted in the death of one oil company employee, the destruction of four gasoline storage tanks, and the loss of some three million gallons of gasoline. In addition, 24 injuries were reported as a result of the incident. The cause of the fire, which occurred on Friday, January 7, 1983 at 12:16 a.m., was determined by local investigators to be the failure to monitor the tank-filling operation properly; the resulting spill was probably ignited by flashback from a nearby incinerator. The incident was declared under control at 4:28 p.m. on Saturday afternoon, January 8. However, the gasoline in the tank continued to burn for more than 24 hours after that and reportedly burned itself out late Sunday night, January 9, 1983.

The blasts, especially the last (and largest) one, appeared to have had tremendous force. A remote and empty storage tank some 1,200 feet away was flattened by the impact, and another tank some 1,500 feet away was also damaged. Other reported damage included flattened railroad freight cars and destruction and fires at a nearby drum refinishing plant. At the truck terminal building, large tank trucks were tossed about, several automobiles were incinerated, and numerous fires were ignited in the general area. In addition, the impact of the blasts damaged several structures of surrounding industrial concerns. Losses have been estimated in the millions.

The configuration of the area and an apparent shift in the wind direction brought vapors from the spill into contact with the suspected ignition source: the incinerator at the metal drum refinishing plant. However, the eventual ignition of the vapors could have occurred, regardless of the wind direction, by other ignition sources, such as automobile or truck engines, smoking materials, or perhaps railroad diesel engines operating adjacent to the tanks.

Although notification of the Newark Fire Department is part of the tank storage facility's standard emergency operating procedures, it appears that during the initial emergency operations at the storage facility, the Newark Fire Department was not notified. It is doubtful that immediate notification of the fire department would have prevented the eventual ignition and explosions. It is quite possible, however, that if the fire department had arrived earlier, fire service personnel may have been caught by the blast, thus increasing loss of life from the incident.

The responding fire service officers and fire fighters handled the situation in a professional and calm manner. A decision to let the fires in the tanks burn themselves out was made after early attempts with the Port Authority foam truck proved unsuccessful and an evaluation was made of the condition of the tanks and exposure factors. Considerable damage to transfer piping was suspected, and the burning tanks were located in a relatively remote area, properly and adequately diked. Attempts to extinguish the blaze may have resulted in further injury. Salvaging the remaining contents was doubtful, and the loss of the fuel weighed against possible loss of life was insignificant.

The principal factor contributing to the fatality and destruction in this fire was the failure to check closely the rising level of the gasoline being pumped into a storage tank. In addition, some error was probably made in calculating available space and pumping rates.

An early effort to promote fire prevention awareness to the public occurred in 1915 when Portland, Oregon developed what was believed to be the first city-wide fire prevention bureau. Fire fighters instructed schools and civic groups on identifying and eliminating fire hazards in the home.

Jefferson Dormitory

College of William and Mary
Williamsburg, Virginia
January 20, 1983

An early morning fire in the Jefferson Dormitory on the campus of the College of William and Mary, Williamsburg, Virginia, January 20, 1983, required the evacuation of 184 occupants and led to an estimated $4 million loss to the structure and contents. Prompt sounding of the manual fire alarm system and evacuation of the dormitory resulted in no injuries to any of the occupants.

The fire was reported to the Williamsburg Fire Department at 1:13 a.m. The fire spread through the sprinklered building in non-fire stopped combustible concealed spaces that were not protected by sprinklers. Efforts by fire fighters to locate and extinguish fire in concealed spaces above ceilings and behind wall surfaces were unsuccessful. After approximately 1-1/2 hours of interior fire fighting efforts, fire fighters were forced to withdraw from the building when the corridor floor of the first floor collasped and cracks formed in the exterior bearing walls. The developing fire caused the loss of the entire West Wing of the building and all of the attic and roof, with extensive damage to the remaining East Wing of the structure.

This fire demonstrated the combined value of fire emergency planning and training, fire drills, and the assigning of responsibility for evacuation procedures. At the time of the fire, most of the 184 occupants in the dormitory were sleeping. Within four minutes of the sounding of the general evacuation alarm, however, the fire officer entering the building reported that most of the students had evacuated the building "in spite of the 14°F weather conditions." The remainder of the occupants were making their way from the building.

As part of the their training, resident assistants are acquainted with fire drill requirements, fire evacuation procedures, and their duties and responsibilities in assuring that occupants are aware of the fire alarm and evacuating the building. In this incident, resident assistants were effective in the exercise of their individual and joint responsibilities in a fire emergency.

The actions of the resident assistant on the third floor of the West Wing were instrumental in initiating the evacuation of occupants while conditions were still safe in the corridors. Upon discovery of smoke entering the third floor corridor, he immediately directed that the evacuation alarm be activated, notified the campus police by phone of the smoke conditions, and then initiated room checks using a master key. Similar actions of the six other resident assistants and the head resident, who occupied a room on the first floor, provided for the timely and safe evacuation of other areas in the dormitory.

Factors contributing to property loss in this fire include:

- Development of the fire within combustible concealed spaces beyond the reach of automatic sprinklers.
- Lack of automatic sprinkler protection in combustible concealed spaces above suspended ceilings.
- Lack of fire stopping in horizontal and vertical concealed spaces.
- Openings in walls and partitions above suspended ceilings allowing fire spread above the ceiling through those openings.

Factors contributing to the successful evacuation of the dormitory were:

- Immediate sounding of the general evacuation alarm upon discovery of smoke conditions in the building.
- Prior practice of evacuation procedures by occupants during required fire drills.
- Resident assistants on each floor who had received training in evacuation procedures.
- Individual initiative of resident assistants to exercise the responsibilities of their positions in ensuring evacuation of occupants.

Silver Leaves Group Home

Eau Claire, Wisconsin
February 7, 1983

An early morning fire in a community-based residential facility resulted in the deaths of six elderly residents. The fire occurred on Monday, February 7, 1983, in Eau Claire, Wisconsin, a small college community 85 miles southeast of the Minneapolis/St. Paul area. The building was a 102-year old Victorian-style, three-story frame dwelling which had recently been converted from a single family structure to a boarding home. The facility provided care for eleven elderly residents who occupied rooms on the first and second floors. All eleven residents were reported to be ambulatory and capable of self-preservation under emergency conditions. Two students were available to attend to residents' needs during the evening hours.

The facility was licensed by the State of Wisconsin, Department of Health and Social Services as a "Community-Based Residential Facility." Frequent inspections of the facility were conducted by members of the Eau Claire Fire Department. Fire protection for the facility was provided by several single-station, battery-operated smoke detectors located within exit access corridors and residents' rooms. A combination rate-of-rise, fixed temperature detector system was provided in the basement area only; the building was not equipped with a manual fire alarm system or an automatic sprinkler system. There were two stairways for evacuation purposes.

A neighbor returning home reported the fire to the Eau Claire Emergency Communication Center. At the time of discovery, flames were showing from the first floor living room window and advancing throughout the building. Police officers in the immediate area arrived on the fire scene and reported several unsuccessful attempts to gain entry to the building to rescue occupants. First arriving fire apparatus reported fire throughout most of the first floor level and heavy smoke emitting from the second floor windows, but there were no abnormal delays in extinguishing the fire. During search and rescue efforts, six fatalities were located by fire department personnel.

Investigators from the Eau Claire Fire Department have listed the cause of the fire as undetermined. The most likely ignition scenario, however, is believed to be a cigarette that ignited ordinary combustible materials within a plastic trash container in the living room area. Investigators believe that once ignition took place in the trash container, the fire spread to a nearby sofa and window drapery material. The fire then continued to grow and spread to other furnishings within the living room including two other sofas, upholstered chairs, and the carpet and underlayment material. At least one of the sofas was believed to contain polyurethane foam as a padding material.

Contributing factors to loss of life in this incident include:

- Failure to detect and extinguish the fire before the critical level was reached within the building. (Critical level is the point in the development of a fire when deterioration of the environment presents danger to life. For a more detailed explanation, see *Fire Protection Handbook*, 15th Edition, Section 6, Chapter 1, published by NFPA.)
- An unprotected stairway that provided a vertical opening through which products of combustion were able to spread to the second floor.
- Delay in initiating evacuation of occupants and in notifying the fire department once the smoke detectors activated.

In Charleston, South Carolina, one fire was started in 1800 when a citizen investigated a leak in a barrel of brandy. He was using a candle to see what the trouble was. The brandy ignited, and the keg of gunpowder nearby added to the merriment of the occasion. In modern times, the man who looks for a gas leak with a lighted match is no improvement.

(*From the History of the Charleston, South Carolina Fire Department*)

Willow Creek Apartments with Wood-Shingled Roof

Dallas, Texas
March 21, 1983

A group fire involving untreated wood-shingle roofing occurred in Dallas, Texas, on March 21, 1983. One of the buildings severely damaged by the fire was partially destroyed in a previous five-alarm fire in 1980.

The Willow Creek Apartments where the fire occurred consisted of 824 housing units in 64 buildings on a 42-acre site. The fire started in an unoccupied apartment and was determined by the Dallas Fire Department to be caused by a malfunction of electrical wiring in an exterior apartment wall. The fire spread upward into the attic and advanced rapidly both internally and externally along the roof.

The fire department ordered a second alarm upon arrival and requested third and fourth alarms in rapid sequence. Flying brands from the wood shingles carried by 15- to 20-mile per hour winds spread the fire to buildings remote from the building of origin. The Dallas Fire Department controlled the fire with a five-alarm response supplemented by two special calls for equipment. Approximately 140 fire fighters using 28 major pieces of fire fighting equipment performed fire suppression. The fire was stopped by effective use of personnel and equipment, including a fire department observer in a helicopter.

The apartment complex sustained losses to approximately 125 apartment units (out of a total of 824 units) in six separate buildings. The amount of the loss was $5,370,000. There was no loss of life resulting from this fire.

Although the City of Dallas has an ordinance requiring fire retardant Class C roofing on new construction, this fire illustrates that the problem of untreated wood-shingle roofs on existing buildings will continue in Dallas for many years.

The hazard of untreated wood-shingle roofs has been recognized by NFPA for several decades. Numerous multi-million dollar conflagrations and group fires in which untreated wood shingles and shakes were a contributing factor have been recorded and reported by NFPA, and the Association has campaigned for many decades for legislation banning the use of untreated wood-shingle roofs. (See the table on page 13.)

The Central Community Home

Worcester, Massachusetts
April 19, 1983

Seven occupants died in a fire involving a facility for former mental-health patients on April 19, 1983. The facility, The Central Community Home located in Worcester, MA, was licensed for lodging and boarding rooms by the city. This was another in a series of fatal boarding home fires in which deinstitutionalized persons are housed.

The three-story wood frame building had open stairs and combustible interior finish. The building was equipped with a manual fire alarm system, a multiple-station smoke detection system powered by the house electrical service, emergency lighting, and portable extinguishers. There was no sprinkler protection.

Nineteen occupants were located in sleeping rooms on the first, second, and third floors. There was no staff person at the Community Home when the fire occurred. A second floor occupant discovered the fire at about 2 a.m. He attempted unsuccessfully to extinguish the mattress fire and then dragged or carried the mattress along the second floor corridor to the bathroom where it flared into a full flaming condition. The occupant then ran downstairs and out of the building.

The fire alarm system activated and most of the occupants were able to evacuate, unassisted, using the front stairway. The fire rapidly spread throughout the second floor, creating untenable conditions on the second and third floors including both stairways.

Large-Loss Multiple Structure Fires[1]
Contributing Factor: Untreated Wood-Shingle and Shake Roof Covering
United States 1972-1983

Date	Location	Type of Occupancy	Reported Property Loss
8/23/72**	Kalakaua and Puuhale Schools Honolulu, Hawaii	Elementary & Intermediate Schools	$ 5,040,000
1/15/73	Dwelling Fire Monterey, California	Single Family Dwelling	500,000
6/2/73	Buildings Under Construction Portland, Oregon	Apartment Complex	850,000
10/21/73	Buildings Under Construction San Jose, California	Apartment Complex	2,000,000
3/3/75	Dwelling Fire Lake Forest, Illinois	Single Family Dwelling	500,000
11/22-27/75**	Forest Fire Glendale, California	Canyon Camping Grounds (35 Dwellings Destroyed)	700,000
12/16/76	Apartment Complex Ontario, California	Apartment Buildings	1,020,000
7/26/77*	Sycamore Canyon Fire Santa Barbara, California	Brush Fire (Conflagration) (239 Dwellings Destroyed)	35,000,000
5/13/78	Apartment Complex Fire Houston, Texas	Apartment Buildings	4,623,900
10/23/78	Kanan Fire (Malibu-Agoura Area) Los Angeles County, California	Brush Fire (197 Dwellings & Acreage Destroyed)	35,106,000
10/23/78	Mandeville Canyon Fire Los Angeles City, California	Brush Fire (50 Dwellings Destroyed)	5,198,000
7/31/79*	Apartment Complex Fire Houston, Texas	Apartment Buildings (Conflagration)	20,000,000
9/16/79**	Building Under Construction Dallas, Texas	Apartment Complex	4,000,000
9/16/79**	Laurel Canyon Fire Los Angeles, California	Brush Fire (24 Dwellings Destroyed)	3,900,000
9/18/79	Eagle Canyon Brush Fire Santa Barbara, California	Brush Fire (Brush & Dwellings Destroyed)	2,800,000
3/29/80**	Buildings Under Construction San Diego, California	Condominium Complex	5,000,000
4/5/80	Apartment Complex Fire Tulsa, Oklahoma	Apartment Buildings	4,000,000
4/11/80	Apartment Complex Fire Tustin, California	Apartment Buildings	5,000,000
7/4/80**	Apartment Complex Fire Dallas, Texas	Apartment Buildings	933,000
11/16/80	Duarte-Bradbury Brush Fire Los Angeles, California	Brush Fire (Dwellings & Acreage)	25,000,000
11/16/80	Tujunga Brush Fire Los Angeles, California	Brush Fire (Dwellings & Acreage)	2,202,500
11/24/80	Panorama Brush Fire San Bernardino, California	Brush Fire (290 Dwellings & Acreage)	38,031,400
4/28/81	Dwelling Fire Los Angeles, California	Single Family Dwelling	500,000
6/14/81	Capistrano & Orange Brush Fire Perris, California	Brush Fire (Dwellings & Acreage)	2,800,000
6/15/81	Dwelling Fire Orange, California	Single Family Dwellings	1,007,000
7/23/81**	Apartment Complex Fire Tulsa, Oklahoma	Apartment Buildings	563,000
4/21/82*	Anaheim Conflagration Anaheim, California	Business with Residential Complex	50,000,000
6/7/82	Apartment Building Fire Houston, Texas	Apartment Complex	549,900
3/21/83*	Apartment Complex Fire Dallas, Texas	Apartment Buildings	5,370,000
TOTALS	**29 Incidents**		**$262,194,700**

***Published Narrative Available**
****Published Bimonthly Abstract Available**
Source: NFPA Fire Records

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[1] **Large-Loss fires include those fires that caused at least $500,000 direct property loss. Business interruption losses are not included.**

The fire department headquarters in Arlington, Massachusetts is probably the only octagonal-shaped fire station in the country. This design, fashioned in the 1920s by architect George Ernest Robinson, enabled returning fire engine drivers to drive the trucks through the station instead of having to back them in. However, this idea of the drive-through station did not catch on until the 1960s.

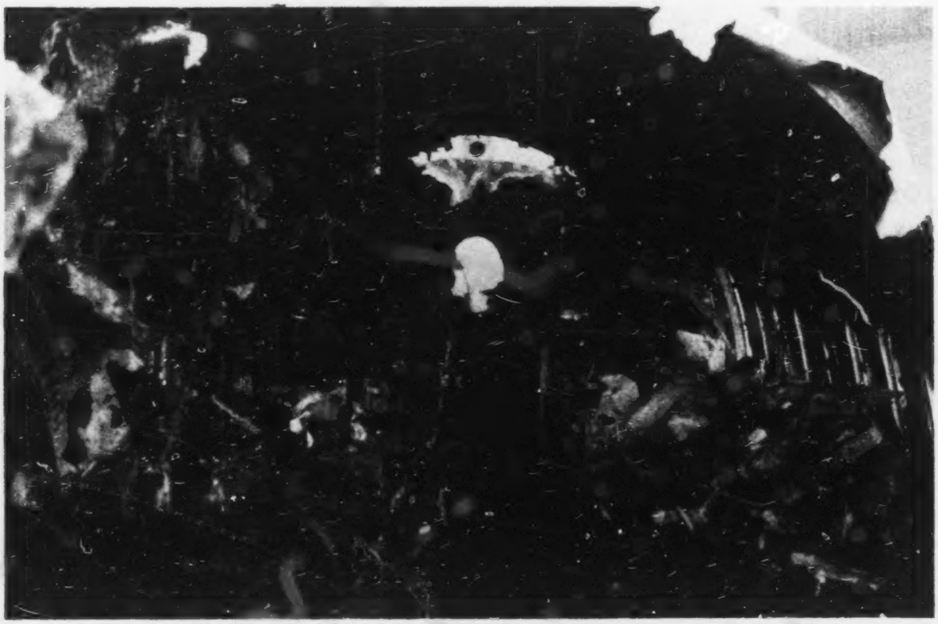
The Worcester Fire Department received an alarm at 2:21 a.m. and reported very heavy smoke throughout the building upon their arrival. The fire fighters conducted search and rescue operations. They made their way to the second floor with difficulty, encountering fire at the second floor landing with the north side of the second floor fully involved with fire. With visibility at zero on the third floor, fire fighters using self-contained breathing apparatus located four victims in two rooms. One of those four victims was located in a closet. Two victims were located in one room on the second floor. The seventh victim died as a result of jumping from a third floor window. One other occupant was critically injured and five fire fighters were injured.

Air Canada DC-9 Fire On-board

Greater Cincinnati Airport
June 2, 1983

On June 2, 1983, an Air Canada DC-9 with 41 passengers and a crew of five was en route from Dallas-Fort Worth to Toronto when the FAA control center in Indianapolis received notification at 7:09 p.m. of an on-board fire. Initial attempts by the crew to extinguish the fire, which appeared to be located in a rear lavatory, were unsuccessful. Passengers were moved as far forward in the aircraft as possible and wet towels were distributed by flight attendants who instructed passengers to hold them over their faces to help shield themselves from the thick smoke which was rapidly building in the cabin. Napkins and other material were also used by the passengers against the smoke.

The aircraft landed at the Greater Cincinnati Airport at 7:20 p.m. The impact experienced by the aircraft upon landing was sufficient to cause failure of all the aircraft's tires. First arriving crash/fire rescue units noted heavy black smoke rolling out over the wing and forward exits immediately following the opening of these exit doors.



Burned-Out Interior of DC-9 Aircraft (NFPA Photo)

Initial fire fighting and fire rescue actions were then directed to protecting those passengers exiting the aircraft. Rescue units applied foam to sections of the aircraft's fuselage in order to maintain the existing exit paths and in an attempt to extinguish the fire. Eighteen passengers safely left the aircraft through forward and over-wing exits. The five crew members were also able to safely exit the aircraft. Fire was first observed inside the cabin by fire fighters within seconds after the last passenger was observed leaving the aircraft. Dense smoke was then noted as being knee level in the left, forward exit, with dense smoke pouring through the windows from the fire inside the cabin. Twenty-three passengers who did not immediately exit the aircraft following landing died in the incident. Fire fighters equipped with self-contained breathing apparatus attempted to enter the aircraft to rescue passengers and extinguish the fire, but were unable to enter due to extreme heat. Following venting of the fire through the fuselage, fire fighters were able to advance into the aircraft, with complete extinguishment of the fire accomplished at 8:17 p.m. (See color photos of this fire in the center color insert.)

Ramada Inn Central

Fort Worth, Texas
June 14, 1983

On Tuesday, June 14, 1983, an early morning fire at the Ramada Inn Central in Fort Worth, Texas, resulted in five fatalities, 34 injured guests, and property loss in excess of $1 million.

Ramada Inn Fire. (Courtesy Fort Worth *Star-Telegram*)

The fire, which was reported to the Fort Worth Fire Department at 3:24 a.m., originated on the first floor of the 2-story, wood-frame building. The 87-room building where the fire was located was part of a motel complex which included a combination lobby/restaurant building and three other buildings housing guests. This building was not protected by automatic sprinklers or smoke detectors and had no fire alarm system.

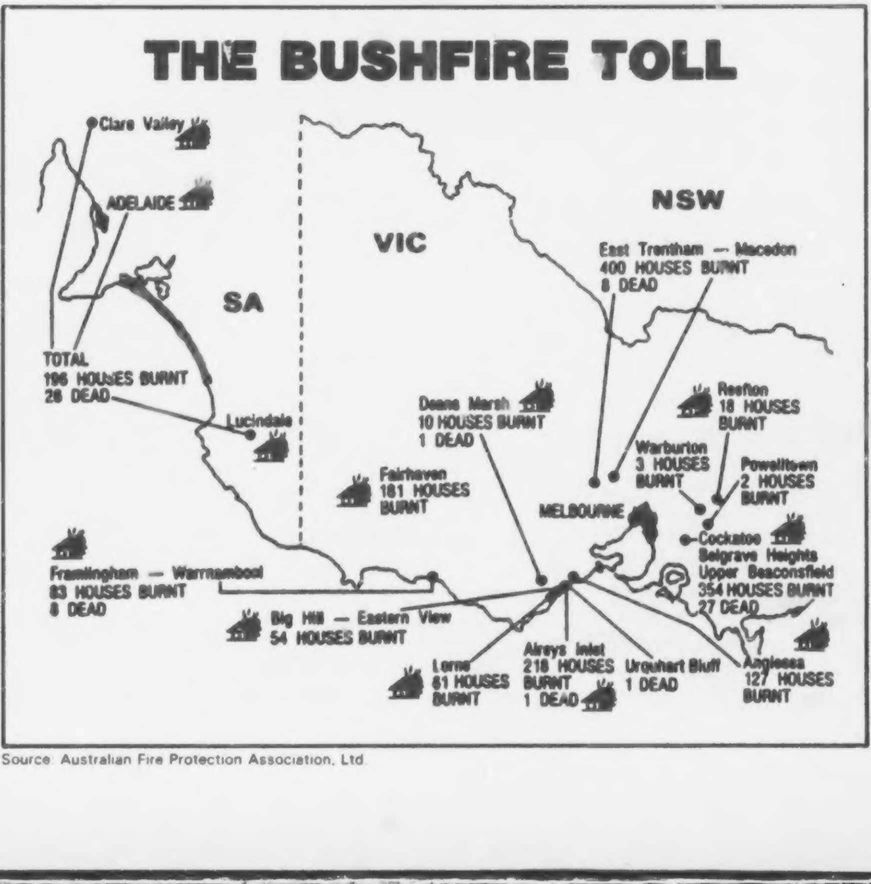
The fire, of undetermined origin, initially involved rolled carpet and padding stored in the exit corridor. Once ignition occurred, the fire grew rapidly and spread fire and smoke the entire length of the undivided corridor. It spread to the second floor by way of three open stairways spaced throughout the building. By the time motel guests became aware of the fire, corridors were filled with smoke. Most guests were forced to escape from the rooms through broken windows. Injuries included cuts, broken bones, and smoke inhalation. Fire department efforts were directed initially to the rescue of trapped guests located at windows.

The fire cause is still under investigation by the Fort Worth Fire Department. The NFPA is studying this major fire in cooperation with the U.S. Fire Administration and the Center for Fire Research, NBS.

Australian Ash Wednesday Bushfires

February 16 to March 8, 1983

Fires that broke out on Ash Wednesday, February 16, 1983, in Victoria and South Australia claimed 72 lives, the largest loss of life from fire in one day in Australia.


THE BUSHFIRE TOLL
Clare Valley
ADELAIDE
SA
VIC
NSW
TOTAL
196 HOUSES BURNT
26 DEAD
Lucindale
East Trentham — Macedon
400 HOUSES BURNT
8 DEAD
Deans Marsh
10 HOUSES BURNT
1 DEAD
Reefton
18 HOUSES
BURNT
Warburton
3 HOUSES
BURNT
Powelltown
2 HOUSES
BURNT
Fairhaven
181 HOUSES
BURNT
MELBOURNE
Cockatoo
Belgrave Heights
Upper Beaconsfield
354 HOUSES BURNT
27 DEAD
Framlingham — Warrnambool
83 HOUSES BURNT
8 DEAD
Big Hill — Eastern View
54 HOUSES BURNT
Lorne
81 HOUSES
BURNT
Aireys Inlet
218 HOUSES
BURNT
1 DEAD
Urquhart Bluff
1 DEAD
Anglesea
127 HOUSES
BURNT

Source: Australian Fire Protection Association, Ltd.

Drought

Southeastern Australia had experienced one of the worst droughts on record. In August 1982, the Country Fire Authority of Victoria was forecasting one of the worst bushfire seasons unless substantial rains fell. These rains did not come. In November, the C.F.A. said that not one part of the State would be free of serious danger from fires.

The eight months from April to November 1982 were the driest on record for most of Victoria and by February, 1983, Melbourne's water storages were holding less then half of their capacity, instead of being reasonably full. Over half of Victoria's 211 municipalities had been declared drought areas.

Not only was Victoria affected. Virtually the whole of Eastern Australia, east of a line joining the head of the Great Australian Bight in the South to Darwin in the North had a deficiency in rainfall, ranging from serious deficiency to the lowest deficiency on record.

Vegetation

Vegetation in southeastern Australia includes grassland and cereal crops, developed conifer forest, developed eucalypt forests, and uncleared and undeveloped eucalypt areas. There are several hundred varieties of eucalypt, ranging from low, bushy mallee or mulga to tall (over 30 meters) trees. Most eucalypts and many other Australian genera are well-adapted to withstand drought, high temperature, and fire. They are not deciduous, but shed their bark which develops into a high fire load on the ground, and the rate of deposition of leaves and bark can vary between 1 and 10 tons per hectare per year. Another characteristic of eucalypts is the presence in their leaves of volatile oils which increase the fire hazard.

Widespread Abnormal Weather

It is of considerable interest to note that Southern Africa, from the Atlantic Ocean to the Indian Ocean, was also experiencing the worst drought since 1915. Some of this abnormal weather can be attributed to the weakening of the southeast trade winds which blow for thousands of kilometers across the equatorial Pacific. This periodical weakening of the Trade winds has been known for at least 100 years; it occurs about every five years and occurs with great intensity about once every decade. When the winds fail, the mass of ocean water that is piled up in the far western Pacific (where the sea level is several centimeters higher than in the east) comes flooding back towards the east. This current diverts the Humbolt Current away from the South American coast, affecting the fishing season for South American countries, raising the temperature of the eastern pacific ocean by up to five degrees, and producing heavy rains on the West Coast of South America. At the other edge of the Pacific basin, the result is abnormally high atmospheric pressures. Over Australia, these high pressure systems prevent the rain-bearing low pressure systems from precipitating on the Australian continent. Thus, from a single cause comes such diverse consequences as drought, flooding, and even blizzards. However, one common result is that lives are lost, property damaged, and national economies are disrupted.

Ash Wednesday, February 16, 1983

During the day, temperatures rose above 40°C; this was the third day in February that the maximum temperature exceeded 40°C. Records have been kept since 1855, and Melbourne, in February, averages only one day over 40°C about every five years. Adelaide also had a day of searing heat with over 40°C with winds of up to 100 km/h.

During the day, fires broke out in the Adelaide hills, in the Clare Valley, in the Southeast of South Australia, and near Port Lincoln on Eyre's Peninsula. In Victoria, fires broke out north of Warrnambool, in the Otway Ranges, the Mount Macedon area, and the Dandenongs. The extreme heat following the long period of dry and hot weather (during which vegetation had become extremely dry), and the high winds, caused the fires to develop very rapidly and to spread at exceptional speeds. The fire in the Southeast of

South Australia was burning on a 120 km-wide front, and spread into Victoria. A forecast cool change in Victoria only brought gale force winds which changed the direction of the fire fronts. The unpredictability of the winds caused havoc.

Weather and drought conditions made it virtually impossible to stop any fires that became "goers"! In both states, the fires were being fought by 4,000 fire fighters, assisted by 600 army personnel. By the evening, reports of losses were starting to come in.

In South Australia police confirmed 11 dead in the Adelaide Hills, and an unconfirmed report said that 11 people died in Lucindale in the Southeast. More than 400 were treated for fire-related injuries, and 30 were admitted to hospitals. In Victoria 12 people were confirmed killed, and 150 houses were reported to be destroyed in four fires.

Both State Governments took emergency action. South Australia declared a state of emergency, the first in its history, giving wide-ranging powers to the Commissioner of Police. Victoria declared a level three disaster, the top level of the State's Disaster Plan. Towns were evacuated and people even spent the night on the beach on the Otway coast, where the coast road out of the area was cut by fire. Smoke and dust forced the closure of Melbourne's three airports. Twelve major fires were burning in South Australia, and these had developed into the state's worst fire disaster. The Victoria Country Fire Authority reported 72 fires in the State. Fire damage was estimated to be at least $100 million.

Thursday, February 17, 1983

By Thursday evening the enormity of the disaster began to unfold. The number of confirmed dead had risen to 69 in the two states — 43 in Victoria and 26 in South Australia. Twenty-seven people had died in the Dandenongs area, and twelve of these were volunteer fire fighters. Seven died in the Southwest of Victoria, six in the Macedon area, and three died in the Otways fire. Specialist police from the Disaster Victim Identification Team were trying to recover bodies and identify the dead. Special morgues were opened and several magistrates were authorized to act as coroners to ensure speedy inquests. Elective surgery was cancelled at metropolitan hospitals to make room for those injured in the fires.

In South Australia, nearly 900 people were treated for injuries and heat exhaustion, and a similar figure was quoted for Victoria.

In Victoria, about 15,000 fire fighters, police, and emergency workers spent their second day fighting fires and aiding victims. Cooler temperatures and evening breezes helped the 4,000 fire fighters contain several of the fires, but one major fire was still out of control in the Warburton area. In South Australia there were still five main fires, generally under control, but flare-ups were expected to be caused by swirling winds of up to 40 km/h, gusting to 50 km/h. There were between 3,000 and 5,000 fire fighters representing 250 to 300 brigades in action.

Revised estimates of losses were produced — 3,000 square kilometers of South Australia burned out. In Victoria 317,000 hectares of forest and grazing land had been destroyed. This included 170,000 hectares of forested Crown land, with an estimated loss of $45 million in timber. Farmland losses were estimated at 125,000 hectares of some of the State's richest agricultural land. National Parks had been devastated. Near Warburton more than $23 million worth of mountain ash had been burned; most of this was regrowth from the 1939 fires. Because of the magnitude and intensity of the fires, the forest regeneration problems are likely to be immense.

Damage in Victoria was estimated at $250 million and up to 2,000 homes were lost, several townships were almost wiped out, and 750 farms were affected. Damage in South Australia was estimated at $100 million in the loss of 400 homes. Losses, insured and uninsured, could exceed $250 million.

Friday, February 18, 1983

The Warburton fire and the Buffalo River fire in Victoria were still burning out of control. The weather forecasts predicted rising temperatures over the weekend, and winds that could change from southeasterly to northerly, causing changes in direction of the fires. There was no prospect of rain. Over 670 fire fighters were fighting the Warburton fire which had burned out 40,000 hectares, and 200 were working on the Buffalo River fire. Dense smoke made normal aerial reconnaissance impossible, but an aircraft fitted with infrared heat detecting equipment was used to pinpoint the worst areas. It was the first time that this equipment was used to fight fires in Victoria. Over 2,000 fire fighters patrolled the still smouldering remains of the Flamlingham, Otways, Trentham, and Dandenong fires.

Confirmed damage in Victoria included 1,641 houses and 174 other buildings, including schools. In South Australia 196 houses had been destroyed. About 8,000 fire victims were registered with the Red Cross in Victoria, and in South Australia there were 500 registered evacuees. Melbourne hospitals treated 21 people with severe burns, and 20 with moderate burns. Hundreds more received treatment for exhaustion, smoke inhalation, and minor injuries.

The Insurance Council of Australia had established an emergency organization of 60 assessors for dealing with claims, and the first 400 applications received averaged $50,000. The insurance bill for Victoria was now expected to reach $100 million.

It was announced that one of the twelve fire fighters to die at Beaconsfield was a woman. She was the first woman fire fighter in Australia to lose her life on duty.

Saturday, 19th; Sunday 20th, February 1983

The Victorian death toll had risen to 45, giving a national toll of 71, equal to the Black Friday disaster of 1939. Twenty-seven died in the Upper Beaconsfield-Cockatoo fire, eight from Warrnambool, three in the Otways, and seven in the Trentham-Macedon fire. The number of homes destroyed had risen to 1,786, and 12,500 people had registered with the Red Cross as fire evacuees.

Sunday had been declared a day of national mourning and many memorial services were held. At Mt. Macedon where churches had been lost, a memorial service was conducted in the bar of the local hotel.

Monday, February 21, 1983

One thousand five hundred fire fighters were mopping up the fires on Monday, and with a forecast maximum temperature for Tuesday of 37°C, a day of total fire ban was declared. A cool southwest change was forecast for Tuesday afternoon, with the possibility of lightning strikes in the northeast of the state. By Monday evening all of Victoria's bushfires were under control, but aerial surveillance was being used to spot any further outbreaks. More than 2,000 insurance claims worth about $83.5 million had been processed in Victoria, and $49 million in South Australia.

Tuesday, February 22, 1983

Only one bushfire was proving troublesome — at Mount Stapleton on the northern edge of the Grampians in Western Victoria. It burned out about 2,500 hectares. A number of psychiatric teams were formed to assist victims of bushfires who suffered psychological trauma. The badly burned southwest of Victoria was one of the main dairy cattle centers, and stock losses there could result in severe milk shortages during the winter.

Wednesday, February 23, 1983

A volunteer fire fighter, injured on February 16th while fighting a fire in the Western District, died in a hospital. This death brought the toll to 46 for Victoria.

A review of the fire losses in the Western District dairy town of Panmure showed how serious the losses were. Two fires converged on the area and destroyed 363 farms, 60,000 hectares of pasture, one million bales of hay and killed 5,700 cattle and 10,000 sheep. One hundred and fifty houses and 70 dairies were destroyed. By the time that more burned animals were discovered, the district would have lost 10,000 of its 40,000 cows. Many more could starve unless rain fell very soon to germinate surviving seeds and produce pasture.

Monday, February 28, 1983

The Insurance Council of Australia had received 3,680 claims worth $133 million from Victorian fire victims, but expected that the final damage total would be much higher. So far 300,000 hectares of land had been burned out. The Country Fire Authority had lost 14 fire fighters, but did not know how many had been injured.

Thursday, March 3, 1983

The Victorian bushfire toll reached 46 when a woman burned in the Upper Beasonsfield fire died in a hospital. This death brought the total number of lives lost in the Ash Wednesday fires in Victoria and South Australia to 72 — one more than the number of deaths on Black Friday 1939. One victim in Victoria had still not been identified.

Tuesday, March 8, 1983

Losses are now estimated at $217 million ($70 million higher than two weeks ago) and may be higher as some of the worst-hit municipalities have not supplied detailed reports of damages.

There were 48 jobs lost in tourism, another 183 retrenchments because of cancellation of tourist visits, lack of passing trade, and the expectation that there will be no improvement in business until well after Easter.

Damage totalled $40.9 million for lost State Agency Assets, $10.2 million from other public service assets, and $166.1 million from the private sector.

There was a large increase in extra operating expenses for Government Departments, totalling $16 million, of which the Forests Commission of Victoria incurred $8.9 million. Losses in the Agricultural sector of $4.3 million in income were expected over the next year, and municipalities expected to lose $700,000 in rate revenue. There were 1,179 houses destroyed, 82 commercial premises including 9 hotels, 11 restaurants, 5 sawmills, 11 stores and milkbars. Further losses included 1,238 farms damaged, 23 dairies destroyed, 5,900 km of fencing, 7,000 cattle and 19,000 sheep killed.

Month of April

On April 7th, the South Australian death toll rose to 27, and the national toll to 73, when a fire fighter died from burns received fighting the fire at Mount Barker. Late in April, the Victorian police announced that they were now satisfied that another body had been identified at the Beaconsfield area where fire fighters were trapped. This brought the national toll to 74.

The Final Count of Losses

- 74 lives lost.
- 1,179 homes lost in Victoria, 169 houses destroyed in South Australia.
- 2 commercial premises destroyed.
- 1,238 farms destroyed.
- 515,000 hectares burned in Victoria, at least 300,000 hectares burned in South Australia.
- 5,900 km of fencing destroyed.
- 7,000 cattle lost in Victoria, 1,000 lost in South Australia.
  19,000 sheep lost in Victoria, 350,000 lost in South Australia.
- 1.1 million bales of hay burned.
- $228 million loss of property in Victoria, but this may be increased as some of the worst-hit municipalities had not been able to supply detailed reports.
- 3,680 insurance claims worth $133 million had been processed in Victoria.

- $41 million losses to Victorian State agency assets, mainly forests.
- $4.3 million loss in income in the agricultural section forecast for next year.
- $17 million — given or pledged to the Bushfire Appeal.

(This article is condensed from a report written by the Australian Fire Protection Association Ltd.)

A History of Horrible Fires in Australia

Black Thursday, 1851 After five weeks of hot north winds, a series of fires begins on February 6 when the temperature in Melbourne reached 117 degrees. The fires burn from Mt. Gambier, past Geelong to Seymour, then east to Dandenong and Diamond Creek where a number of settlements are destroyed.

1919-1920 48,500 hectares of the Grampians burn in the Victoria Valley. The fire begins in November 1919 and is not put out until April 1920.

Black Friday, 1939 In January five fires hit almost every part of Victoria. 71 people die, millions of hectares are damaged or destroyed. Melbourne's temperature that day is 112.5. The damage bill is $14 million.

January 14, 1944 58 homes are destroyed, eight are damaged and 600 hectares are burned at Beaumaris.

January 14-17, 1962 The first of many battles for the Dandenongs. More than 300 houses and shacks are destroyed and eight people die.

February 7, 1967 More than 62 people are killed, thousands are left homeless and the property bill is put at $30 million as thousands of square kilometers of south-eastern Tasmania are on fire in what is the second worst fire in Australia's history.

January 8, 1969 An enormous grass fire along the Geelong to Melbourne Road near Lara claims the lives of 17 holiday makers. Other big fires are out of control north of the Great Divide.

February 12, 1977 The historic township of Streatham is burned to the ground in minutes, leaving five men dead and seven people the victims of heart attacks. Eighty-one homes, 200,000 head of stock and community hall, shops, the post office, and a hardware store are destroyed.

January 15, 1978 Two people die and 13 are injured as fire sweeps through East Gippsland, destroying 26 homes, a church hall and threatening the township of Bairnsdale.

February 22, 1980 Until yesterday, South Australia's worst fire. Twenty-five homes and 75 farms are destroyed in the Adelaide Hills. No deaths are recorded.

November 5, 1980 Five volunteer fire fighters are burned to death as they lie under their truck at Waterfall, 50 kilometers south of Sydney.

February 3, 1981 Fire ravages the West Coast of Tasmania with 40 homes destroyed in the township of Zeehan. The total fire bill is estimated at $5 million.

February 16, 1982 The Premier of Tasmania, Mr. Holgate, declares a state of emergency as 11 fires throughout the State cause $5.5 million damage.

January 31, 1983 A fire starts at Cann River which is to burn for two weeks across 120,000 hectares causing millions of dollars of damage to pine forests and threatening the township of Mallacoota.

My Playground, Just Ashes

by Damien Murphy

The coastal playground between Lorne and Torquay is where many Victorians spent some of the better days of youth. There are among us some who find it hard to grow up, and we make regular returns to the playground. It wasn't much fun yesterday . . . seeing your youth burned out.

One day in February 1968, this diarist was pulling beers for a holiday job in the Lorne Hotel beer garden. On the beach below, women, toting children, suitcases and the odd television set, were gathering on the sand. Away to the east at North Lorne, houses exploded into flames while relieved fire fighters with red eyes sipped beers and asked barstaff how they liked making sandwiches all night.

Not much had changed yesterday.

Red-eyed fire fighters were still drinking and still asking barstaff about night-shift sandwiches. At North Lorne, the ruins of 62 homes smouldered and people were on the beach: only this time they were sunbaking or riding surfboards off the point.

The main change in 15 years was a yellow helicopter overhead. It kept returning and dunking a big, pink bucket in the sea to fly off and douse a burning gully somewhere in the Otway Ranges.

At North Lorne, a man who last weekend looked down on the blue waters of Loutit Bay through a wall of glass on the sea side of his cedar home turned a tap that stuck out of the debris: no water came.

Lorne has been devastated. Not that it lost a greater proportion of houses than other communities. It's just that North Lorne is the cheaper side of town and the place where most of the permanent residents who service the resort live.

On Wednesday afternoon, 23 homes clung to the cliffs along the Lorne-Big Hill stretch. They are the sort of places that cost a Tattslotto win. A local real estate agent was asking around $180,000 for his solid brick solitude three years ago. One wall remains. John Scott's unusual spherical silver home that was passed in at auction a couple of months ago is a molten mess.

Vern Bentley, a former carpenter who built the first place at Big Hill in the late 50s, managed to salvage a snorkel from the wreckage. "I want to build the place again with my bare hands, but you see I've had two heart attacks," he said.

The picture postcard Great Ocean Road gateway lies a charred remnant beside the bitumen.

Last Monday, I sunburned my nose on the beach at Eastern View in front of a blue and white house which marks the end of the stretch of road that runs from Fairhaven. The house is the only one untouched along that part of the coast.

It belongs to Ron Burton, a local identity who on Wednesday completed 7 1/2 years as a councillor with Barrabool Shire, the municipality that bore the brunt of the west coast fire. He arrived home with a commemorative certificate from the council only to drop it and flee.

Mr. Burton returned at first light yesterday after spending the night on Anglesea beach — with hundred of others — to discover his home was the sole survivor. Next door, Jim Cairns' holiday shack was razed.

At lunch, there was whisky, chops and tea and the Burtons settled down to discuss what was gone. Mostly, they spoke of the genteel retirement village of Airey's Inlet.

Dame Joan Hammond's splendid house in the bush behind town was a write-off. So too was the holiday home of the co-ordinator general of education, Dr. Lawrie Shears. The place where Arthur Upfield wrote many of his 'Boney' books many years ago also was razed.

Then there was the Angahook 'Bark Hut'. A pet project of local conservationists for many years, it was finally classified by the National Trust. Despite the firece debate as to whether or not the builder, one Thomas Pearce, died of hepatitis or from breaking his leg falling from a horse, the town's most valued historic building is no more.

But with some 218 houses in Airey's listed as destroyed, the question of whose place survived was moot.

The Airey's Hotel, the heart of the town, was broken.

Across the road, the Airey's Lighthouse Restaurant, which throughout the holiday season carried the sign "air-conditioned, tables available tonight" was no more.

The road and verges along the coast were littered with dead animals. Near Dame Joan's property, a joey stood alone among burned trees with a thousand-yard stare in its eyes.

From Urquhart's Bluff to Anglesea there was only black. Above the bluff the only home in the area, owned by the father of Victoria's gift to the surfing world, Wayne Lynch was lost.

About 150 homes were destroyed in Anglesea. Mainly at the back of town and along the road out to Lorne. The golf links, which supports the State's most photographed kangaroo population, was cinders.

Meanwhile, Torquay township was pretty quiet yesterday. The busy surf industry, with overseas wet suit orders to meet, carried on with women workers while most of the men put in some time around a blaze nears Bells Beach.

Despite the disaster, some coastal habits die hard. Dick Vesey, a retired pilot of Airey's Inlet, who was left with only the clothes he stood in (plus a silver ball-point pen which he graciously lent me when mine went on the blink), spent the night with hundreds huddled on Anglesea beach. A family arrived: husband, wife, two children, two cats and a dog. "Somebody called out 'no dogs allowed on the beach'," Mr. Vesey said.

(This article was written by the Australian columnist, Damien Murphy, and originally appeared in "Ash Wednesday," February 16, 1983, a joint publication by "The Age," "The Adelaide Advertiser," and the Printing and Allied Trades Employers Federation of Australia. Courtesy of the Australian Fire Protection Association Ltd.)

What Happened in Fire Protection in 1983

Honeywell Recalls Smoke Detectors

On May 24, Honeywell, Inc., announced the voluntary recall of 770,000 battery-operated smoke detectors. The announcement was made in cooperation with the U.S. Consumer Product Safety Commission.

The smoke detectors, manufactured in 1977 and 1978 as model numbers TC89B and TC89C, do not always operate when smoke is present, although the units might alarm when the test button is sounded. Honeywell, which no longer manufactures smoke detectors, agreed to replace affected units with comparable models.

Honeywell also announced the establishment of a toll-free telephone number (800-328-8194) for consumers to call if they think their detectors are included in the recall.

NFPA, Model Building Code Groups Sign Agreement

On June 6, NFPA President Robert W. Grant and the presidents of the nation's three model building code organizations signed a memorandum of understanding on the cooperative investigations of major fires.

Joining President Grant at signing ceremonies in Birmingham, Alabama, were Douglas E. Geldbach of the Building Officials and Code Administrators International (BOCA); C.T. Sanidas of the Southern Building Code Congress International (SBCCI); and H.T. Wiedenman of the International Conference of Building Officials (ICBO).

Under the terms of the agreement, the three building code organizations will provide technical staff support for NFPA's fire investigations program.

Representatives of all four organizations regard the agreement as a major advancement in the coordination of the nation's codes and standards.

Federal Fire Service Task Group Elects Officers

William D. Killen, chief of the Washington National Airport and Dulles International Airport Fire Departments (Federal Aviation Administration) was elected chairman of the Federal Fire Service Task Force on February 9.

Others elected officers for the group were: Al Kirchner, administrator of fire protection for the U.S. Marine Corps (Vice Chairman) and William Shelton, assistant fire chief, Fort Belvoir Fire Department, U.S. Army (Secretary/Treasurer). The new state of officers will serve throughout 1983 and 1984.

The Federal Fire Service Task Group consists of fire protection professionals from various federal agencies and departments, including the Department of Defense, who have fire protection management responsibilities.

NAS and FCA Now National Fire Sprinkler Association

The National Automatic Sprinkler and Fire Control Association shortened its name to become the National Fire Sprinkler Association (NFSA).

First established in 1914 as the National Automatic Sprinkler Association, the NFSA has more than 300 member companies that manufacture or install automatic sprinkler systems. Along with the name change, the NFSA changed its by-laws to create Associate Memberships. Persons, corporations, or firms that manufacture, sell, or distribute materials and services used in sprinkler systems are eligible for associate membership.

NFPA Designing Smoke Detector Awareness Program

The NFPA will design a nationwide smoke detector awareness program, Association President Robert W. Grant announced during the NFPA Annual Meeting in Kansas City in May.

The program's goal, as described during the official announcement, is "to provide fire departments with the means to create community awareness and to establish local smoke detector programs." An advisory board of nationally recognized leaders assists in the development of the program, funded by a grant from the Tobacco Institute.

Bonnafon Chairs/Monihan Joins NFA Board of Visitors

Larry M. Bonnafon, chief of the Louisville, Kentucky, Fire Department, was named chairman of the National Fire Academy Board of Visitors. E. James Monihan, chairman of the National Volunteer Fire Council, was named to a three-year term as a member of the Board during 1983.

The Board was established by the Congress to periodically review the Academy's program and operations. The seven-member Board is also charged with making specific comments and recommendations about Academy programs.

First WHERF Exams Held

In April the Wood Heating Education and Research Foundation (WHERF) conducted the first of its examinations leading to the certification of solid-fuel heating installers.

Successful completion of the three-hour multiple-choice examination leads to certification as a Solid Fuel Safety Technician. The tests were held in 30 U.S. cities and administered by the Educational Testing Service of Princeton, New Jersey.

WHERF, a tax-exempt corporation, was organized in 1981 by the Wood Heating Alliance, the trade association for the solid-fuel appliance industry. Additional information about the program is available from the Wood Heating Education and Research Foundation, 1101 Connecticut Avenue, N.W., Washington, D.C. 20036.

Fire Service Section Observes Anniversary

The NFPA Fire Service Section observed its tenth anniversary in May 1983.

The section traces its beginnings to a 1972 survey of NFPA members to determine interest in a fire service section. As a result of the overwhelmingly favorable survey results, the NFPA Board of Directors authorized the formation of a steering committee to develop a section. That steering committee developed a constitution and by-laws, which were approved by the Board of Directors on December 12, 1972. The section held its inaugural session in St. Louis, Missouri, during the 1973 NFPA Annual Meeting.

The Fire Service Section is one of 11 membership sections of the NFPA. According to the Fire Service Section Executive Secretary, James V. McKiernan, the section now has 3300 members.

Fire Professors Honored

Dr. Dougal Drysdale of the University of Edinburgh in Scotland and Dr. Howard Emmons of Harvard University in Cambridge, Massachusetts, were both honored during 1983 for their contributions to fire protection.

Drysdale was named Fire Protection Man of the Year by the Society of Fire Protection Engineers (SFPE) during that organization's yearly meeting, held in conjunction with the NFPA Annual Meeting in Kansas City. He was cited for the development of a graduate level text on fire dynamics, authored while he was on loan to the Center for Firesafety Studies at Worcester Polytechnic Institute in Worcester, Massachusetts.

Emmons was honored at the annual fire research conference of the National Bureau of Standards Center for Fire Research for his years as fire professor and researcher at Harvard. He is scheduled to retire from the Harvard faculty in late 1983.

NFPA President Robert W. Grant praised the contributions of the two professors. "Dougal Drysdale and Howard Emmons have both advanced the fire protection state-of-the-art by using sound academic and research techniques to increase our understanding of fire phenomena," he said. "That kind of understanding is critical to the Association's efforts to help mankind live more safely with fire," according to the NFPA president.

First Fire Protection Computer Conference

The first nationwide, interactive computer conference for fire protection professionals was held January 19, under the sponsorship of the National Fire Academy.

The conference was hosted by Mike Fay, instructor in the Academy's microcomputer course. Course students were the participants in this first-ever conference.

A similar, follow-up conference was held February 15. That conference, hosted by Fire Academy staffer Tom Minnich, focused on the use of computers in arson investigation.

NFPA Establishes Member Discounts

The National Fire Protection Association (NFPA) instituted its "dual pricing" program, effective January 1983.

Under the dual pricing system, NFPA members receive a 10 percent discount when purchasing NFPA products and services. At the same time, NFPA began accepting Visa and Master Card credit cards for all orders over $10.

Bogardus Named California State Fire Marshal

Ronald W. Bogardus was named to a four-year term as state fire marshal by California Governor George Deukmejian.

A state fire marshal, Bogardus is responsible for three regional and 18 field offices, with a staff of approximately 150 persons. A registered professional engineer, Bogardus holds an MA degree from California Lutheran College. His 18-year fire service career includes experience as fire chief of Oxnard, California.

Florida International University Awards First Fire Science Degrees

Florida International University (FIU) awarded its first two bachelors degrees in fire science in April 1983.

The FIU fire science program was established as part of the federally funded Open Learning Fire Service Program. Approximately 270 other students, not all seeking degrees, are also enrolled in the academic program.

Additional information about Florida International University's fire science program is available by calling (305) 554-3040.

Stafford Wins Each One Reach One

Edward J. Stafford, Assistant Executive Director for the New York State Health Care Facilities Association, was the grand prize winner of NFPA's Each One Reach One membership contest.

An NFPA member since 1982, Stafford sponsored 29 new members of the Association. As his grand prize, he received an all-expense paid trip to the 1983 Annual Meeting in Kansas City, a videocassette recorder, and a $250 voucher for NFPA publications.

Second place winner was Sidney Wolkin, Manager of Product Engineering for Lightolier in Jersey City, New Jersey. Alan Grossnickle of Miller's Merry Manor in Peru, Indiana, took third place honors in the contest.

The Each One Reach One contest was a year-long campaign to increase the NFPA membership.

Dallas Switches Back to Red

In April 1983, the Dallas (Texas) Fire Department took delivery of its first red fire apparatus in almost a decade.

The Dallas department had been specifying emergency apparatus that was lime yellow in color and topped with white. The department decided to revert to the more traditional red emergency apparatus because the lime yellow color had not reduced accidents and had proven to be more expensive to maintain.

New York Fire Commissioner Named

On February 17, New York City Mayor Edward Koch announced that Joseph E. Spinnato would serve as permanent fire commissioner for the city.

Spinnato, the city's twenty-fifth fire commissioner, had served in an interim capacity since October 1982. He replaces former commissioner Charles T. Hynes.

Isman and Manning Named Chiefs

During 1983, Warren Isman was named chief of the Fairfax County Fire and Rescue Department in Virginia. Also during the year, Donald Manning was appointed as chief engineer and general manager of the Los Angeles City Fire Department.

A member of the Montgomery County (Maryland) Fire and Rescue Services since 1972, Isman had served as chief of that department since 1977. He also chairs the IAFC Committee on Hazardous Materials.

Chief Manning most recently served as Deputy Chief of the Los Angeles City Fire Department. He has served in a variety of positions since joining that department as a fire fighter in late 1955. Most recently, he commanded the department's Bureau of Support Services.

National Foam Opens Norway Plant

National Foam System, Inc., opened new manufacturing facilities in Radoy, Norway, as part of Solberg Scandinavian System A/S.

The new plant produces National Foam Aer-O-Water and foam concentrates used in fire protection for flammable liquids. In addition to manufacturing, the plant offers fire testing and foam quality evaluation services.

1983 Year in Review — National

by
George K. Horvath

The scope of national politics in 1983 had been established in the off-year elections of November 1982, when Democrats picked up 26 House seats that enabled the party to neutralize the coalition of Republicans and conservative Democrats that prevailed in the previous Congress. The Senate remained under Republican control with an unchanged 54-46 ratio.

The seemingly brisk and bipartisan spirit of the first seven months of the 98th Congress came to an end following the long August recess. Partisan bickering and legislative inaction was to become the order, with few or no major initiatives anticipated before the November 1984 Presidential elections.

The state of the economy promised to be the major issue as the year began. House Democrats introduced a number of "recession relief" bills, but as the economy rapidly improved during the first half of the year, only two of these bills cleared both chambers; one was on veterans' job training, and the other on extended unemployment benefits.

While it became increasingly difficult in the House to legislate broad economic policies, Congress became preoccupied with making detailed spending decisions within the framework of the 13 Fiscal '84 appropriations bills. Defying President Reagan's budget proposal, some members of Congress tried to boost certain segments of the Administration's budget with inordinate sums of money. The Democratic leadership, however, managed to move some budget items back to more reasonable amounts, with promised presidential vetoes in mind. By August, the House passed eight Fiscal '84 appropriations bills, seven of which were approved by the Senate. Although the House leadership was jubilant about being able to come to terms with President Reagan, the five most controversial appropriations measures were to be acted upon after the 1983 summer recess.

Center for Fire Research to Continue

On June 23, Congress suffered a major setback when the United States Supreme Court declared unconstitutional the self-asserted power of Congress to veto Executive Branch and independent agency actions. The ruling, which affected some 200 statutes that contained legislative veto provisions, was based on the Separation of Powers doctrine. As a result, both the House and the Senate were grappling with possible solutions. Rewriting all the statutes affected, or allowing Congressional disapproval with the President's concurrence or disapproval — these were among the choices pending in various committees of Congress.

With regard to agencies directly concerned with public firesafety, President Reagan's Fiscal '84 budget contemplated the elimination of the *Center for Fire Research* within the National Bureau of Standards. An almost instant Congressional outcry in opposition to the Administration's proposal assured continued funding for the Center. NFPA testified in March before both the Senate Committee on Commerce, Science and Transportation, and the House Committee on Science and Technology in favor of retaining the Center. In the end, the Center was reauthorized at a $6,836,000 level, $500,000 more than its previous funding level (S.821 and H.R.2513). The increase was to cover cost-of-living increases in salaries, as well as higher costs of supplies and maintenance.

The final chapter of this story remains to be written. Before the Center for Fire Research receives any funding for Fiscal '84, Congress must pass, and the President must sign into law, the appropriations bill that contains funds for the U. S. Department of Commerce. The fate of the appropriations bill could affect the Center for Fire Research, although there were no negative indications as of press time.

National Bureau of Standards to Transfer to National Science Foundation

Proposals to reorganize and to revamp the *U. S. Department of Commerce* (DOC) into a *U. S. Department of Trade* emerged at the beginning of 1983, with various functions within the Department slated to be transferred to other agencies. The Commerce Department is the parent agency of the National Bureau of Standards. For years, the Department of Commerce had been considered a catch-all agency with functions as diverse as weather forecasting, foreign trade, and fisheries. The intent of the reorganization was to strengthen U. S. competitiveness in the international marketplace, leading to a reversal of the long-standing unfavorable international trade balance. In the shuffle, the National Bureau of Standards was slated to be transferred, to come under the aegis of the National Science Foundation. Congressional approval of the President's reorganization plan was pending as of September.

A Reorganized USFA

The *United States Fire Administration* (USFA) was not on the endangered species list for Fiscal '84. Its authorizations and appropriations went smoothly, with an extra $1 million over previous levels added by the House Science and Technology Committee. Fiscal '84 appropriations for the USFA, at a $15.7 million level, were enacted into law (Public Law 98-45). Following last year's near-dismantling of the agency, which resulted in USFA programs being limited largely to training, 1983 brought new initiatives in the field of arson abatement and fire fighter health and safety.

The USFA was reorganized into four offices, with each office assigned a number of program areas:

- The *Office of Fire Policy and Coordination* was assigned responsibility for improving the National Fire Incident Reporting System, for reviewing the USFA's historical accomplishments, for public/private sector partnership, for management of the regional fire libraries, and for long-range planning.
- The *Office of Fire Fighter Health and Safety* was charged with apprenticeship training, issues affecting fire fighter clothing, breathing apparatus, fire injury diagnostic procedures, fire fighting tools and equipment research and development, and development of a fire service safety officers' guide and manual.
- The *Office of Fire Prevention and Arson Control* is in charge of implementing the Arson Information Management System and the Juvenile Firesetter Treatment Program, and with managing the Federal Arson Task Force. In addition, this office has responsibility for improved use of codes, residential sprinklers, smoke detectors, teleconferencing, the arson resource center, arson computer data, rural arson, and related programs and projects.
- The *Office of Fire Data and Analysis* is in charge of the National Fire Incident Reporting System grants, technical improvement and support of data reporting systems, analysis of major and unusual fires, the Kerosene Heater Survey, the Fire Fighter Death Survey, and other related programs.

National Fire Academy Reorganized

The *National Fire Academy*, located at the Federal Emergency Management Agency's (FEMA) National Emergency Training Center, came of age in 1983. A reorganization affecting its programs, as well as its management structure, assured competent and efficient delivery of training programs in which the federal role "is a cooperative and sharing one...which takes benefits of the hands-on experience at the state and local level," according to one Presidential aide who spoke at the Academy's 1983 graduation ceremonies.

Since President Reagan took office, 50,000 fire fighters and allied professionals have taken advantage of Academy courses – 10,000 at the resident site in Emmitsburg, Md., and 40,000 through field programs. Altogether, the Academy deals in eight program areas: 1) Education (including Public Fire Education); 2) Management Technology (including Emergency Medical Services); 3) Executive Development; 4) Organizational Development; 5) Arson Abatement; 6) Hazardous Materials; 7) Community Resource Preservation; and 8) Emergency Incident Policy and Analysis. Each of these program areas is headed by a program "chair." In turn, program "chairs" (1) through (4) and (5) through (8) respectively are headed by assistant superintendents.

U. S. Consumer Product Safety Commission Firesafety Activities

The *U. S. Consumer Product Safety Commission* (CPSC) continued to press for funds to cover two of its firesafety programs: one focusing on upholstered furniture, bedding, plastics, heating systems and toxicity; the other on electrical hazards, including electrical fire investigations, electrocution hazards and cooking appliances. But Fiscal '84 activities of the agency will continue to be restrained by a $35 million funding level. Even this amount is 10 percent above the level requested by the Administration (Public Law 98-45).

Other 1983 Firesafety Legislation

A flurry of other firesafety concerns emerged during the year in the form of Congressional hearings and proposed legislation. These included cigarette safety and combustion products toxicity.

On the subject of *cigarette safety*, two bills (S.51 and H.R.1880) were introduced to require the Consumer Product Safety Commission to establish standards for self-extinguishing cigarettes. In testimony, the tobacco industry expressed its strong opposition on grounds that Congress was trying to legislate technology that did not exist. At press time, Congressman Joe Moakley (D-MA), sponsor of the proposed legislation, was revising his bill for final Committee action. NFPA continues to maintain its long-standing support for fire-safe cigarettes.

In a hearing before the Senate Labor and Human Resources Committee, chaired by Senator Orrin Hatch (R-UT), testimony of various experts focused on the fact that too little was known at present to evaluate the effects of the *toxicity of combustion products.* No legislation was introduced.

Following the fiery emergency landing of an Air Canada airliner in Cincinnati in June, the Federal Aviation Administration (FAA) was sharply criticized for its failure to adequately regulate the *flammability of aircraft* interiors. Hearings were held and bills were introduced both in the House and Senate (S.1621, H.R.3264 and H.R.3793) to require commercial passenger-carrying aircraft to be equipped with smoke detectors and automatic fire extinguishers in all lavatories and galley areas. The FAA promised to revise its regulations concerning aircraft interior flammability and to conduct crash tests in early 1984. The FAA also promised that a proposed rule would be issued in July 1983, but as of September the rule was not yet forthcoming. In a related concern, the FAA also was considering a proposal to cut back on crash/fire/rescue requirements at small airports.

The U. S. Department of Housing and Urban Development (HUD) moved closer to abandoning its *Minimum Property Standards*, which reference numerous NFPA standards. HUD's idea is to replace its present system of federally mandated standards with permission to rely on model building codes, which, in turn, may reference NFPA standards. HUD's action regarding Minimum Property Standards for multi-family dwellings is anticipated in early 1984.

With Criminal Code Amendments to stiffen *arson penalties* enacted in 1982, arson was again the subject of much rhetoric and one substantive action. This action flowed from the fact that in Sioux City, Iowa, two fire fighters died fighting a fire set by an arsonist, and six other fire fighters were injured. This tragic circumstance was made worse when a federal court ruled in the criminal prosecution of the arsonist that the enhanced penalty provisions of 18 *U.S.C.* 844 (those enacted in the previous year) did not apply to the death and injury of fire fighters; thus arsonist was not penalized for causing the death of the fire fighters. Senator Charles E. Grassley (R-IA) moved swiftly to introduce S.1716, Public Safety Officers' Protection Act, to remedy the deficiency in the Criminal Code. Final outcome of this bill was still pending at press time.

Fire and Life Safety Deficiencies Found in Federal Buildings

In August, federal inspectors uncovered close to 900 fire and life safety deficiencies in 140 U. S. government buildings in the Washington, D.C. area. A survey found 353 deficiencies in 34 federally owned high-rise buildings, including 92 for lack of adequate sprinklers and 63 with exit problems. The rest of the deficiencies were in buildings leased by the federal government.

Fire Service Legislative Issues

Three actions of the 98th Congress are of interest specifically to the fire service. These pertain to contracting out of fire fighting functions on military bases, applicability of the Public Safety Officers' Benefit program to federal fire fighters, and applicability of antitrust laws to actions of municipal regulatory officials.

A two-year continuation of a prohibition for military establishments to *contract out fire fighting* and base security functions was included in the Fiscal '84 Department of Defense Authorization measure (H.R.2969 and S.675). Senator George Mitchell (D-ME), proponent of the prohibition, provided ample justification for his proposal. Fire fighter strikes, loss of established mutual aid agreements with local governments, and national security considerations such as wartime preparedness were among his concerns. Opposition to the prohibition came from the Republican side, fostered by the U. S. Chamber of Commerce, which took an official position opposing the prohibition. Action on the House side was pending at press time.

Another issue dealt with by one house of Congress pertains to the applicability of the *Public Safety Officers' Benefit* (PSOB) program to federal law enforcement officials and fire fighters. Administered by the U. S. Department of Justice, the program heretofore provided $50,000 in death benefits to survivors of state and local law enforcement officers and fire fighters killed in the line of duty. On July 26, the House passed H.R.622 by an overwhelming margin (390-33). The bill would extend these death benefits to federal law enforcement officers and fire fighters. Similar legislation had cleared other sessions of Congress: President Carter vetoed a similar bill during his tenure, and in 1982 a similar provision was included in the House continuing appropriations resolution, but was deleted in House-Senate conference. At press time, final Congressional action was pending.

Senate Judiciary Committee Chairman Strom Thurmond (R-SC) introduced legislation (S.1578, *Local Government Antitrust Act* of 1983) that would clarify the applicability of federal antitrust laws to conduct by local units of government and to private conduct authorized by them. Until recently, it was assumed that the state action immunity doctrine, articulated in the 1943 Supreme Court decision of *Parker* v. *Brown* (317 U.S. 341), applied not only to the states but to local units of government as well. However, in 1978 the Supreme Court held that the *Parker* immunity for local governments was not automatic, but rather must be derived from the state, with the local government entity acting "pursuant to State policy to displace competition with regulation or monopoly public service" (*City of Lafayette, LA* v. *Louisiana Power & Light Co.*, 435 U.S. 389). In 1982, the Supreme Court found that a state's grant of home-rule powers to a municipality was insufficient authorization by the state to cloak the municipality in state action immunity (*Community Communications Co., Inc.* v. *City of Boulder, CO*, 455 U.S. 40).

Although the two Supreme Court decisions did not pertain to actions of fire officials, the implications are clear. If allowed to prevail, regulatory action by any municipal official could be challenged on the basis of federal antitrust laws.

Senator Thurmond's remedial legislation does not automatically extend protection from the antitrust laws to local governments. Rather, local governments would be given protection from the antitrust laws only to the extent that state government entities would be protected for similar activity. In addition, local governments would have to overcome two more hurdles. First, the activity in question must otherwise be valid under state law, and second, it must not involve the sale of goods or services by the local government in competition with private persons. With this legislation, the need for local government to go about its daily functions without the fear of antitrust lawsuits is balanced by the need to preserve the integrity of the federal antitrust laws. Final legislative action was pending in September.

The FTC and Standards-Making

And finally, for those interested in the standards-making activities of NFPA, the *Federal Trade Commission* (FTC) came to the final stages of its trade regulation rulemaking proceeding on Standards and Certification, initiated in late 1978. The FTC's Bureau of Consumer Protection transmitted its Final Staff Report on April 1, recommending the promulgation of a sharply cutback, bare-bones rule, as compared with the expansive rule originally proposed. Six weeks later, the Presiding Officer issued his Report recommending that no rule be promulgated, even though he found ample wrongdoing by standards developers and certifiers. Final action by the Commission on the two reports was pending at press time.

1983 Outlook

1983 was the third year of the administration of President Reagan and constituted the First Session of the 98th Congress. Legislation introduced during the First Session stays alive until the end of the Second Session. 1984 will be a Presidential election year, and the Second Session promises to be politically loaded and short in duration. Every House seat is up for election once again, and the fate of one-third of the Senate seats will be determined in November 1984.

Best Media Coverage of Fire Fighting, 1983

Every year, the International Association of Fire Fighters honors news media for reporting and photography that best portray the professional and hazardous work of the U.S. and Canadian fire fighter. There are six general media categories, each with a first prize of $500 and second prize of $250. Material published between Jan. 1 and Dec. 31, 1984, is eligible. Nominations must be submitted by local unions by March 15, 1985. Further information is available from the local fire fighters union or by writing to: Awards Contest, International Association of Fire Fighters, 1750 New York Ave., NW, Washington, DC 20006.

1983 IAFF Media Awards Winners

Best News or Feature Story in a Newspaper of Less than 100,000 Circulation

First Prize: "The Day that Two of Danbury's Firefighters Died," by Tom Drury in*The Litchfield County Times*, New Milford, CT.

Second Prize: "The Firefighter: Guts and a Heart," by Patrick Mott in *The Register*, Santa Ana, CA.

Special Citation: "Beverly Hills, The Tragedy Can Happen Again," by Bert Workum, Al Salvato, Bill Straub, and Karl Kuntz in *The Kentucky Post*, Covington, KY.

Honorable Mention: "Home Fire Safety Is Up to You," by Charles E. Fierson in the *Easton Express*, Easton, PA.

"Deaths Burn Into Firemen's Psyches," by Ken Robinson in the *Meriden Record-Journal*, Meriden, CT.

Lumberyard fire series by Roscoe C. Blunt, Jr. in *The Evening Gazette*, Worcester, MA.

"Experts Reveal Most Common Hazards," by Mark Morse, Michael Smith, and Vicki Regone in *The Wheel*, Ft. Eustis, VA.

"Home Away from Home/Full Assignment," by Deb Miller in the *Glendale News-Press*, Glendale, CA.

"The Burning Passion," by Bill Tonelli, in the *Atlantic City Magazine*, Atlantic City, NJ.

"The Kartini Affair," by Paul Ditzel in *Firehouse Magazine*.

Best News or Feature Story in a Newspaper of More than 100,000 Circulation

First Prize: "P.G. Fire Fighters: Perilous Shortages," by Leon Wynter in *The Washington Post*, Washington, D.C.

Second Prize: "They Sky is Red," by Jim Shea in *The Hartford Courant*, Hartford, CT.

Honorable Mention: "Are Kerosene Heaters Safer than the Users?" by John Fiarhall in *The Evening Sun*, Baltimore, MD.

Three columns on the work of the professional fire fighter by Don Rodricks, *The Evening Sun*, Baltimore, MD.

Best News or Feature Photo in a Newspaper of Less than 100,000 Circulation

First Prize: "Gasping for Air," by Richard A. Chapman in the *Daily Courier News*, Elgin, IL.

Second Prize: Uncaptioned photo by Danielle Pallotto in *The Montgomery Journal*, Montgomery County, MD.

Honorable Mention: "Rescue from Floodwaters," by Charles S. Vallone in *The Journal-Times*, Racine, WI.

"And the Fire Just Keeps on Burnin," by Bill Eisner in the *North East Detroiter*, Detroit, MI.

Best News or Feature Photo in a Newspaper of More than 100,000 Circulation

First Prize: "Arson Victim," by Mike Okoniewski in the *Syracuse Herald Journal*, Syracuse, NY.

Second Prize: "Fast Aid," by Bill Murphy in *The Oregonian*, Portland, OR.

Honorable Mention: "Chivalry Lives," by Daymon J. Hartley, two-photo series for United Press International.

"Brave Effort," by Anne Lennox Bergmanis in the *Democrat and Chronicle*, Rochester, NY.

"3 Fire Fighters Hurt," by Jim Laragy in the *Democrat and Chronicle*, Rochester, NY.

"4th Alarm Tire Factory," by Bill Eisner in the *Detroit Free Press*, Detroit, MI.

Best Local Union Publication

First Prize: *Seattle Fire Fighter*, Seattle, WA
Second Prize: *The Los Angeles Fire Fighter*, Los Angeles, CA
Honorable Mention: *The Master Stream*, Erie, PA
All Hands, Montgomery County, MD
Toledo Fire Fighter, Toledo, OH
The Portage Fire Fighter, Portage, MI
The Baltimore City Fire Fighter, Baltimore, MD

Best Television News or Feature Coverage

First Prize: Tom Armitage, KBCI, Boise, ID for "The Fire Fighters."

Second Prize: Jeff Hirsch and Grant Light, WLWT-TV, Cincinnati, OH for "Paramedics."

Honorable Mention: Jack Rinehart and Dave Garlock, WRTV, Indianapolis, IN for a report on the special responsibilities of a rescue squad.

Geoff Smith and Tom Coggins, KOMO-TV, Seattle, WA for a survey of the training required to produce professional fire fighters.

Rich Adams, WDVM, Washington, D.C. for an editorial in support of funds for the city's rescue squads.

Best Radio Commentary

First Prize: "Toxic Fires," by Laurie Garrett, KOED-FM, San Francisco.

Second Prize: "Heat or Heartbreak," by Hal Bruno, ABC National News.

Honorable Mention: "Profiles of Fire Fighter Heroes," by Dave Zorn, KNX Radio, Los Angeles, CA.

Letters of Commendation

Public service spot television announcements written and produced by members of IAFF Local 176, Tulsa, OK.

A series on the consequences of fire-setting by children by Tom Andrews and Kathy Mykleby, WISN-TV, Milwaukee, WI.

To Consolidate or Not to Consolidate

History of Consolidation

In the North American fire service little was heard about the consolidation of fire and police departments before 1950, although the first consolidation in the Western Hemisphere occurred in Trois-Rivieres, Quebec, Canada as early as 1857. The first consolidation in the United States took place in 1911 in Grosse Pointe Shores, Michigan. Then on July 1, 1950, the community of Sunnyvale, California, north of San Jose, adopted a consolidated public safety force to handle both police and fire emergencies. Sunnyvale at that time was a developing area of former orchard lands which were being converted into residential and commercial properties. When consolidation was initiated, the community had a population of only about 9,000 persons. At about the same time there were several other small communities in California where police and volunteer fire fighters provided what limited fire protection was available.

Likewise, in 1954, the suburban residential community of Oak Park, Michigan, had outgrown its volunteer fire department. Rather than employ paid fire fighters, the police department was designated the "Public Safety Department." The plan adopted was to have "public safety officers" on duty at the department headquarters, who drove fire apparatus to fire alarms where they were assisted by other officers dispatched in patrol cars who served as call fire fighters.

From 1954 to 1956, the idea that police and fire services could be consolidated to some extent received national publicity. Proponents of the idea argued that fire fighters had considerable stand-by time in the fire station that could be employed for other municipal duties, including some police work. In 1954, an article by Charles S. James entitled, "A Frontier of Municipal Safety" that appeared in *Public Management* magazine published by the International City Managers' Association advocated consolidation and was followed the next year by *Concepts of Fire-Police Integration* by the same author and published in the same magazine.

In 1955, the proposal was first made by the city manager of Peoria, Illinois, that police in squad cars could be dispatched on fire alarms to assist in fire fighting and thereby cut fire protection costs by further reducing the staffing of the already under-staffed fire companies. This proposal was not actually adopted until 1961 (the city abandoned the proposal July 1, 1971). Meanwhile, in 1956 more national publicity was gained by Consolidation proponents when an article by Karl Detzer entitled "New Deal in the Old Firehouse" was published in the *Reader's Digest*.

Forms of Fire-Police Consolidation

Without a long-standing precedent to follow, consolidation of fire and police services has developed in a variety of forms and degrees, according to a community's attempt to meet local needs with available resources. Basically, however, there are five major types of consolidation. Functional consolidation is the most common form of consolidation, followed by full, administrative, partial, and area. Most U.S. cities with some form of consolidation (55.6%) have populations between 5,000 to 25,000, are located in the north central (33%) or northeast (20%) region(s) and are satellites of a larger central city (36%).

Functional Consolidation combines administrative and a limited number of operational functions. Some cities have retained their separate departments, but instead of employing public safety officers, they have assigned duties of one department to members of the other. For example, fire fighters may help with administrative tasks in the police station, or police officers may prepare hydrants for hoses at a fire scene before the apparatus arrives.

In Glencoe, Illinois (pop. 10,000) the fire-police program was initiated at the request of fire and police personnel. In 1954, a voluntary training program was begun with personnel given a salary increase upon completion of a fire-police course. Although they maintain separate job identity, personnel in each department perform some duties of the other.

Partial Consolidation is an advanced stage of functional consolidation, the only difference being that most of the operating functions are combined. Various forms of combined services have been developed that can best be described as partial consolidation. Probably the most common form is that in which the community retains the traditional two departments, but a corps of public safety officers is recruited from the fire and police departments as a means of improving service and supposedly making productive use of stand-by time. Personnel are trained in both fire and police duties and placed on patrol. When fighting fires, they serve under the operational control of the fire department, otherwise they are under police department jurisdiction.

Full Consolidation is achieved by combining all administrative and operational activities into one public safety department. Under this system, one department replaces the former two departments; i.e., both the fire and police departments are abolished and replaced with a Department of Public Safety. In some cases, the fire or police department is abolished and the functions of one are transferred to the other.

The department head, known as the Chief or Director of Public Safety, is held responsible for the coordination of all fire and police services and activities. The department is staffed by public safety officers who must be equally capable of performing both fire and police duties. A minimum number of personnel remain on-duty in the fire stations. They spend their time performing administrative duties or training exercises, and respond to all fires and emergencies with the apparatus. The remaining officers are assigned to patrol duty. While on patrol, they combine fire prevention duties with police patrol functions. These officers respond in their patrol vehicles to fires and other emergency calls received by radio and attempt to fill in as part of the fire fighting team. The best example of this form of consolidation is the city of Sunnyvale, California (pop. 96,000).

Administrative Consolidation occurs when both departments maintain separate operational identities but combine administrative functions. These administrative functions include administration, clerical, personnel, training, etc. In many cities, police and fire services are combined within a single organizational department.

Area or Selected Area Consolidation occurs when fire-police services are performed jointly within a certain geographic location. This type of consolidation allows for certain operational functions to be jointly carried out within specific locations. The administrative functions may or may not be combined in these geographic areas. One example of this type of consolidation is found in Winston-Salem, North Carolina (pop. 150,000). The city experimented with cooperative programs beginning in 1957 in low-fire-risk areas before expanding to a comprehensive Public Safety Officer (PSO) program in 1972. These PSOs perform fire and police duties and staff stations in low-fire-risk areas only. Winston-Salem has retained separate fire and police services, but the PSO's report to the police department.

Conclusion

Although consolidation offers the potential advantages of reduced costs, improved police patrol coverage, and shortened fire alarm response times, the disadvantages can result in higher costs, legal restrictions, labor relations problems, political opposition, low morale, high personnel turnover, administrative difficulties, operational difficulties, and reductions in fire prevention and public service activities. These disadvantages are manifested in large cities (pop. above 25,000) where the efficiencies of consolidation are progressively negated by increase in size and demand for fire protection.

In consolidated cities, fire service costs are usually reduced, but the savings are more than offset by a rise in police costs. Public Safety Officers normally work only 40 hours per week at higher pay rates than police and fire fighters. It has also been found that the conversion period to consolidation results in increased costs that are sometimes never recovered. These costs are due to building modifications and construction, new equipment purchases, and training. The high personnel turnover observed among PSOs also increases the training costs of consolidated programs. In addition, the cost of abandonment can also be considerable.

There are several cities that have abandoned their fire-police consolidations; Peoria, Illinois is one of the most prominent. Partial, full, and administrative consolidation programs are abandoned most often. Cities that have abandoned consolidation programs are between 10,000 to 50,000 population (55.2%); located in the southwest (37.9%) or north central region (24.1%) of the U.S.; and are satellites of a central city.

NOTE: R. J. Coleman, Director of Fire Protection for San Clemente, California, has developed an extensive library on police-fire consolidation. Copies are available as a resource by writing to Mr. Coleman.

NFPA's Viewpoint: Consolidation of Fire and Police Departments

For many years, the idea of combining fire and police departments to reduce the costs of public protection services in municipalities has been proposed. At any time during the last twenty to thirty years, there have been a few small communities experimenting with consolidation of fire and police departments in one form or another.

The National Fire Protection Association has studied fire departments in cities and towns of all sizes throughout the United States and Canada for many years, and is convinced that there is no advantage, either in economy or efficiency, when police and fire department functions are combined. It is the Association's opinion that a community needs both good police service and good fire service and that the combination of the two results in poorer police service and poorer fire service.

The well-run police department and the well-run fire department operate so that all personnel are fully occupied throughout their working hours in the many special functions that each of these departments is required to perform. The modern fire department in any community, large or small, fully occupies all personnel with training procedures, fire prevention inspection procedures, maintenance and other activities. Good fire fighting requires exceptional teamwork by a fire company. Personnel who have divided duties and responsibilities cannot operate as effectively as do full-time, trained fire fighters whose sole responsibilities are fire fighting operations and related activities.

It should be noted that most U. S. communities are not large enough to support fully paid fire departments. In such communities, a fire department with part paid personnel or a volunteer fire department is, in NFPA's opinion, superior to a combined fire and police department. NFPA believes that when fire and police departments are combined, the fire department suffers more than the police department and that the overall fire protection of the community is not at the proper level. The Association has not yet received convincing evidence that either the police or the fire service in a community with a combined fire and police department is providing as good protection to the citizens of the community as that community would enjoy if it maintained separate fire and police departments.

The skills level and behavorial characteristics needed by police and fire fighters are vastly different. The tendency to give priority to one appears to be directly related to the background and original discipline of the person appointed to head the consolidated department. Fire fighting requires specific technical skills and continuous re-training to prevent skills deterioration.

NFPA has observed that where there is a consolidated department, an additional layer of administration is created at the top level, which then creates a need for two leaders at the second level, one for police and one for fire. This arrangement is not at all cost effective.

If a community is concerned about its safety, it should carefully consider the many negative effects of consolidation, particularly in the areas of fire prevention and firesafety code enforcement. Despite arguments to the contrary, it is clear that both prevention and enforcement suffer when personnel have dual responsibilities.

U.S. And Canadian Cities With Police-Fire Consolidation

Full Consolidation

A single entity combining the functions of two or more agencies.

Current (1983)

Oakwood, OH (9,000[1]) 1924[2]
Aiken, SC (PSO)[3] (15,000) 1977
Escanaba, MI (PSO) (15,000) 1975
Beverly Hills Village, MI (12,000) 1958
North Augusta, SC (PSO) (14,000) 1972
Port Royal, SC (PSO) (3,000) 1977
Rosemont Village, IL (PSO) (4,000) 1974
Folly Beach, SC (1,000) 1974
Riverside, MO (3,000) 1973
Farmington, MI (11,000) 1954
Gladstone, MO (29,000) 1968
Glencoe Village, IL (PSO) (10,000) 1954
Glencoe Village, WI (5,000) 1956
Bayside Village, WI (5,000) 1956
Bloomfield Hills, MI (4,000) 1974
Coolidge, AS (7,000) 1975
Des Peres, MO (7,000) 1961
Essexville, MI (5,000) 1959
Huntington Woods, MI (8,000) 1929
Lapeer, MI (6,000) 1959
Manistique, MI (4,000) 1960
Osawatomie, KS (5,000)
Palm Springs Village, FL (8,000) 1976
Quincy, FL (8,000) 1963
Rogers, MI (4,000) 1943
Walterboro, SC (6,000) 1977
Woodway, TX (6,000) 1975
El Dorado, KS (PSO) (13,000) 1964
Oak Park, MI (PSO) (37,000) 1954
Grosse Pointe Shores, MI (3,000) 1911
Grosse Pointe Woods, MI (PSO) (22,000) 1944
Sunnyvale, CA (PSO) (107,000) 1950
Atlantic Beach, FL (PSO) (10,000) 1978
Ottawa, KS (PSO) (11,000) 1976
Shorewood, WI (16,000) 1928
Augusta, KS (6,500) 1960
Fox Point, WI (6,500) 1956
Sewickley Hgts., PA (1,000) 1920
Gilbraltar, MI (2,200) 1960
Lake Alfred, FL (1,300) 1954
Foster City, CA (10,000) 1966
Moorhead, MN (35,000) 1967
Town and Country, MO (2,700)
Westmont, PA (7,000)
River Hills, WI (2,000) 1948
Alamagordo, NM (25,000)
Ontario International Airport
DFW Regional Airport 1971

Abandoned

Biloxi, MS (5,000)
Buena Park, CA (PSO) (63,000) 1953-1956
Fayetteville, NC (PSO) (55,000)
Peoria, IL (127,000) 1962-1971
Highland Park, IL (21,000) 1958 (6 mos.)

Partial Consolidation

Organizations are administratively consolidated with extensive but not total integration of operational functions.

Current

Morganton, NC (PSO) (15,000)
Chapel Hill, NC (PSO) (30,000) 1975
Cayce, SC (PSO) (10,000)
Flagstaff, AZ (PSO) (26,000) 1975
Fraser, MI (14,000) 1973
Sikeston, MO (16,000) 1976
Highland Park, TX (9,000)
Cottage Grove, OR (8,500)
Brunsville, MN (PSO) (36,000) 1964
Durham, NC (PSO) (106,000) 1970
Oakland Park, FL (PSO) (22,000) 1973
Neptune Beach, FL (PSO) (8,000)
Brown Deer Village, WI (PSO) (13,000) 1967
Dearborn, MI (112,000) 1957
Boulder, CO (79,000) 1969
Chicago Hgts., IL (29,000) 1957
Edina, MN (25,000) 1957
East Grand Rapids, MI (15,000) 1962
Rock Falls, IL (12,000) 1950
Mexico, MO (16,000)
Ormond Beach, FL (21,000)

Abandoned

Placentia, CA (PSO) (25,000)
Oregon City, OR (10,000) 1954-1958
St. Petersburg, FL (220,000) 1971-1974
Evanston, IL (75,000)
Elgin, IL (48,000)
Boyne City, MI (3,000) 1962-1963

Area Consolidation

Services normally performed by two or more agencies are performed by a single agency in a selected geographical area.

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[1] Population
[2] Year in which program was initiated
[3] PSO indicates Public Safety Officer program

Current
Texarkana, AR (21,000) 1975
Winston-Salem, NC (PSO) (150,000) 1972
Spartanburg, SC (42,000) 1959
Abandoned
Daytona Beach, FL (PSO) (48,000) 1973-1979

Functional Consolidation

Organizations are administratively consolidated *and* a limited number of operational responsibilities normally performed separately are carried out jointly.

Current
Chesapeake, VA (104,000) 1969
Owosso, MI (18,000) 1976
Parsons, KS (12,000) 1970
Eden Prairie, MN (9,000) 1973
South Fulton, TN (3,000) 1965
Taft, CA (4,000) 1977
Richfield, MN (43,000) 1973
St. Louis Park, MN (47,000) 1964
La Junta, CO (8,000)
Park Forest, IL (28,000) 1957
Centerline, MI (10,000)
Kodiak, AK (4,000)
La Palma, CA (10,000) 1965
Salinas, CA (60,000)
Upland, CA (40,000)
Green Cove Springs, FL (5,000)
Safety Harbor, FL (5,000)
Cordele, GA (12,000)
Jerome, ID (5,000)
Eureka, IL (5,000)
Naperville, IL (30,000)
Rock Falls, IL (12,000)
Villa Park, IL (30,000)
Zion, IL (20,000)
Iowa City, IA (50,000)
Washington, IA (8,000)
Council Grove, KS (3,000)
Garden City, KS (15,000)
Rayne, LA (10,000)
Brunswick, ME (15,000)
Oxford, MA (10,000)
Berkeley, MI (25,000)
Caro, MI (5,000)
New Prague, MN (35,000)
Marshall,. MD (15,000)
Kearney, NE (20,000)
Allendale, NJ (8,000)
Cresskill, NJ (8,000)
Neptune City, NJ (8,000)
Norwood, NJ (5,000)
Passaic, NJ (60,000)
Riverside, NJ (10,000)
South Brunswick Twsp., NJ (16,000)
Tenafly, NJ (15,000)
Glen Cove, NY (30,000)
Ogdensburg, NY (15,000)
Boone, NC (10,000)
Kings Mountain, NC (9,000)
Mooresville, NC (9,000)
Scotland Neck, NC (3,000)
Wake Forest, NC (5,000)
Brecksville, OH (10,000)
Deer Park, OH (10,000)
Fairport Harbor, OH (5,000)
Oberlin, OH (10,000)
Salem, OH (15,000)
Woodlawn, OR (8,000)
Ashland, PA (5,000)
Carnegie, PA (4,000)
Edgewood, PA (5,000) 1930
Ford City, PA (5,000)
Huntington, PA (8,000)
Mount Penn, PA (5,000)
Northampton, PA (10,000)
Sharpsville, PA (7,000)
Sugar Notch, PA (7,000)
Wilkins Twsp., PA (9,000)
Travelers Rest, SC (2,500)
Abilene, TX (102,000)
Hearne, TX (6,000)
Richmond, TX (7,000)
Stamford, TX (6,000)
University Park, TX (25,000)
Windsor, VT (3,000)
Colville, WA (5,000)
Bridgeport, WV (5,000)
Shawano, WI (7,000)
Rawlins, WY (8,000)
Midfield, AL (7,500) 1960
Abandoned
Danville, VA (40,000) 1961-1965
Canada
St. Hyacinthe, Quebec (25,000)
Asbestos, Quebec (10,500)
Chicoutimi, Quebec (30,000)
Drummondville, Quebec (30,000)
Granby, Quebec (29,000)
Grand Mere, Quebec (15,000)
Joliette, Quebec (19,000)
Kenogami, Quebec (11,000)
La Tuque, Quebec (12,000)
Longueuil, Quebec (15,400)
Montreal-Nord, Quebec (27,000)
Riviere-du-Loup, Quebec (11,200)
Ste-Agathe-des-Monts, Quebec (5,500)
St. Jean, Quebec (19,000)

St. Joseph d'Alma, Quebec (12,000)
St. Laurent, Quebec (39,000)
Sorel, Quebec (16,500)
Thetford Mines, Quebec (22,000)
Shawinigan Falls, Quebec (30,000)
Trois Rivieres, Quebec (57,000) 1857
East Kildonan, Manitoba (28,000)
Cap-de-la-Madeleine, Quebec (31,500)
Mount Royal, Quebec (17,000)
Rimouski, Quebec (16,300)
St. James, Manitoba (27,000)
St. Lambert, Quebec (14,000)
St. Foy, Quebec (15,000)
Franscona, Manitoba (10,000)
Valleyfield, Quebec (30,000)
St. Laurent, Manitoba (300)
Westmont, Quebec
Sherbrooke, Quebec
St. Jerome, Quebec

Administrative Consolidation

Agencies retain identities but one or more administrative services are consolidated. Operational services remain separate.

Current

Atlanta, GA (500,000)
Dunedin, FL (20,000)
Arlington, MA (55,000)
Melvindale, MI (13,000)
Lincoln, MA (5,200) 1962
North Palm Beach, FL (10,000)
Northfield, IL (10,000)
Bedford, IN (15,000)
Cranford, NJ (30,000)
Margate, NJ (12,000)
South Brunswick, NJ (n/a)
Wildwood, NJ (5,000)
Johnstown, NY (12,000)
White Plains, NY (60,000)
Cincinnati, OH (500,000)
Middletown, OH (50,000) 1950
Bedford, PA (4,000)
Pittsburgh, PA (550,000) 1950
Woonsocket, RI (50,000) 1953
Park City, UT (2,000)
Richmond, VA (25,000)
Maplewood, MN (30,000)
Henderson, NE (23,500)
Mercer Island, WA (20,000)
Wayne, MI (21,000)
San Marcos, TX (20,000) 1976

Abandoned

Milpitas, CA (30,000)
Morgan Hill, CA (10,000)
Pleasanton, CA (20,000)
Mountain Brook, AL (21,000) 1953-1968
Maple Hgts., OH (35,000) 1953-1968

Unclassified

Form of consolidation unknown.

Current

Jackson, LA (5,000)
Nome, AK (2,400)
Palmer, AK (1,000)
Monterey Park, CA (31,000)
Sanger, CA (11,000)
West Miami, FL (8,000)
Bayonne, NJ (75,000)
San Diego, CA (700,000)
San Marino, CA (15,000)
Hillsdale, IL (600)
Scottsville, KY (4,000)

Abandoned

Fremont, CA (27,000)
Hollywood, FL (35,000)
Hawthorne, CA (32,000)

Fire Service in the Year 2001

by
John C. Gerard

What will the world be like in the year 2001 A.D.? Needless to say, no one *really* knows, but many people, qualified or not, share their views and predictions with us. Regardless of whether these predictions are accurate or not, certain events have already occurred which profoundly change our todays and tomorrows. These changes and a myriad of other alterations to our daily lives can be bewildering and even bizarre at times. Value systems change. The time-honored lifeboats of church, government, and family are being tossed about in stormy seas. Resources are becoming more scarce and more expensive. All of this is frightening to some and can lead to a state of anxiety called "future shock" by Alvin

Toffler. We cannot allow this anxiety to immobilize us. We must believe in tomorrow, even though our resources will be more scarce and tomorrow will be a different world. Developing the fire service of the future will be determined by how accurately we identify the problem areas and how well we apply technology in the use of resources and in developing solutions to problems. To be successful in the future means using technology to manage more effectively. The responsibilities we accept in the fire service mean that we must do our utmost to influence what tomorrow will be. We must be involved in those elements of the future that will have the greatest impact on delivery of fire and emergency protection.

Changes in technology and scarcer resources are only part of the challenge of the future. The social fabric of society is also changing. Today we are witnessing test-tube babies, genetic alteration, the sexual revolution, an increase in the number of working women, and the end of the nuclear family. Suddenly we find that "getting married" and "family" have new meanings. These social changes are only part of the new look in most communities. Today's citizen is likely to be more active in local affairs and more vocal about the levels of service that are provided. The days are gone when the fire chief decided what was to be done, and how. Today we must be prepared to sell the citizen on the fire protection system of the future.

What will that system be? Computers are a growing presence in many aspects of our daily lives. They have a great potential for assisting fire departments. Computer-assisted dispatching gets the fire company on the street quicker and provides better resource allocation and distribution. Information systems are being used for managing fire department business and personnel matters, for scheduling inspections and keeping fire prevention records as well as arson information, all with a view toward improving code enforcement and using resources more effectively.

Another electronic innovation that holds great promise for increasing the effectiveness of fire department operations is cable television. The automatic alarm system using cable television is a growing and effective use of new technology, and through reliable earlier warning, fire companies are on the scene faster, fires are smaller, and the fire suppression system is more efficient. Another effective use of cable systems is the enormous field of public education. Some communities are very active in the use of cable for firesafety education. Since citizens are becoming more active and interested in local government this interest can be exploited by the fire service to teach people how to live a more fire-safe life through the use of cable television programs.

The impact of rising fuel costs must be offset. By the year 2001, fuel could cost as much as $9 to $10 per gallon. This would create incredibly high operating costs which in turn would have a dramatic impact on the strategy and tactics used on the fireground. We must develop more efficient operating methods that are sensitive to variations in the built environment.

Another even more dramatic resource problem for the fire service of the future is the supply of water. Most futurists predict profound water shortages worldwide by the turn of the century. Why? Partly because of old, leaky water systems, and partly due to people living in areas where water is already scarce, like Arizona, Texas, and California. Another aspect of the shortage will be increased agricultural and industrial use and, finally, that oldest of all reasons — population growth.

Profound water shortages dictate the need for more efficient water use. We are familiar with the great quantities of water used in the manual suppression of fires. As fire service professionals, we must be active in developing improved methods of water application. We must be prepared to discover and apply new technology. Having an impact on shaping the future, in one sense, means developing aggressive programs that support the installation of sprinkler systems, remote alarm systems, and methods yet to be discovered.

One of the most significant and dynamic fields of interest today is the built environment. Positive changes in the built environment could lead to substantial improvements in the use of fire service resources. A technological breakthrough is the low-cost, fast-response sprinkler system.

Another significant development is the increasingly close rapport of the building official and fire official, working to identify improved fire protection options. The role of fire protection engineers in the building process is recognized and their skills and expertise are being applied in improving construction. Each of these developments promotes alterations in operating methods, making the fire department more efficient.

We in the fire service make use of many resources — water, fire apparatus, built-in protection, and so forth—but our most valuable resource is our people. It is fair to recognize that the social changes noted earlier have had an impact here. Today's fire fighters (and thus tomorrow's) are new and different individuals. They have the traditional intense dedication to improving the quality of life in their communities, but they also have a much greater concern for the quality of their own lives. Fire fighters have never viewed their jobs as simply "a day's work for a day's pay." But today's fire fighters, even more than their predecessors, want their work to be meaningful and skillfully guided, free of unnecessary hazards and risks. They also want a voice in setting the priorities of the department, not in the sense of union versus management, but as a desire for more direct input into the ultimate goals of the department. This will require fire service managers of the future to be far more skilled and knowledgeable than their predecessors.

Another complicating aspect of fire department personnel management is the advent of the female fire fighter. Women in the work force have become a reality in most occupations. Today we see women as astronauts, construction workers, carpenters, and telephone line workers, among other occupations. Some major metropolitan fire departments are aggressively developing programs to make fire service careers available to women.

There are those who view this as a threatening and unnecessary action, but let us look at some of the realities. Most knowledgeable futurists predict that the number of women in the work force will continue to increase, and by the year 2001 women will represent almost half of all the available workers. Is it not logical then to develop methods for recruiting from the full labor force? Part of the answer to this question lies in making the work of a fire fighter less dependent on the ability to perform heavy manual labor. Once again, we are challenged to make use of technology. Improvements must be made in operating methods, in the built environment, and in the tools, equipment, and apparatus used by fire fighters. It is possible to develop a future-oriented action plan even in as sensitive an area as the composition of the work force.

Some facets of tomorrow will be an extension of today but the future is NOT just another day like today. It will be different. It will be unique. It is therefore necessary to develop unique approaches to the future. We must be attuned to the developments affecting the fire service. It is clear we will be challenged to make better use of scarce resources. It is also clear that we must apply technology to meet these challenges.

You may think that this does not apply to you. But before you decide that, remember that the fire apparatus you purchase this year will be in first-line service past the year 2001. The fire fighters who will become recruits are already in elementary school. So the turn of the century is not really the future — it is today. What a fire service manager does today will develop the future.

There is one thing we know for sure — if we do not plan for, work for and develop the future, someone less capable will do it for us. We owe it to the fire service to shape the future of fire protection. Our legacy must be that we did our best to guide the fire service into the year 2001 and beyond.

Organizations and People

Joint Council of National Fire Service Organizations

The Joint Council of National Fire Service Organizations was organized in Williamsburg, Virginia on September 1, 1970, with the intent and purpose of providing a way for national fire service organizations to cooperate informally in the definition and achievement of those national goals of the fire service in which they share a community of interest.

Member Organizations and Delegates

Chairman, 1983, Louis Amabili, ISFSI
Secretary, Joseph M. Redden, NFPA
Batterymarch Park
Quincy, MA 02269

Fire Marshals Association of North America
Howard H. Summers, Jr.
Chief Fire Marshal
Office of the State Fire Marshal
Virginia Department of Housing
and Community Development
205 North Fourth Street
Richmond, VA 23219

Robert B. Smith, Executive Secretary
Fire Marshals Association of North America
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Washington, DC 20024

International Association of Arson Investigators
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International Fire Service Training Association
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Oklahoma State University
Stillwater, OK 74074

Howard Boyd, Chairman
International Fire Service Training Association
4018 Lealand Lane
Nashville, TN 37024

International Municipal Signal Association
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Providence, RI 02903

Robert Llewellyn, Executive Director
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Ft. Worth, TX 76112

International Society of Fire Service Instructors
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Superintendent
Georgia Fire Academy
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Marietta, GA 30060

Louis J. Amabili, Past President
Delaware State Fire School
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Dover, DE 19901

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Batterymarch Park
Quincy, MA 02269

International Association of Black Professional Fire Fighters
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New York, NY 10026

Clarence Williams
Executive Vice President
IABPFF
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Seattle, WA 98122

National Volunteer Fire Council
James Monihan, Chairman
National Volunteer Fire Council
45 Sussex Dr.
Lewes, DE 19958

Ron Miller, Vice Chairman
P.O. Box 34
Fairbanks, IA 50629

Fire Marshals Association of North America

Capital Gallery, Suite 220
600 Maryland Ave., SW
Washington, DC 20024
202-484-8200

The Fire Marshals Association of North America which was organized in 1906 and reorganized in 1927 as a section of the National Fire Protection Association, is a body of fire marshals, heads of fire prevention bureaus, fire investigators and their staffs. Membership is open to those officials holding the positions named above who work for a state, a province, a county, a town, a city, a municipality or a fire protection district, and to whom the responsibility for fire prevention or investigation has been assigned by law or delegated by the chief of the fire department.

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Virginia Department of Housing and Community Development
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State Fire Marshal
West Virginia State Fire Commission
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Charleston, WV 25305

Charles G. Stuart
Fire Marshal
City of Calgary Fire Department
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Calgary, Alberta, Canada T2P 2M5

International Association of Arson Investigators

25 Newton Street
P.O. Box 600
Marlboro, MA 01752
617-481-5997

The International Association of Arson Investigators was formed at Purdue University, West Lafayette, Indiana in 1949, when insurance industry, fire service, and law enforcement personnel from the United States and Canada met to discuss the growing arson problem and the need for training and education in fire investigation. The Association has the following objectives:

- To unite for mutual benefit those public officials and private persons engaged in the control of arson and kindred crime;
- To provide for exchange of technical information and developments;
- To cooperate with other law enforcement agencies and associations to further fire prevention and the suppression of crime;
- To encourage high professional standards of conduct among arson investigators;
- To continually strive to eliminate all factors which interfere with administration of crime suppression.

IAAI Executive Staff

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New Jersey State Police
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Island Heights, NJ 08732

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Tucson, AZ 85701
Jack Sneed
Texas Firemen Training School
College Station, TX 77843

International Association of Fire Chiefs

1329 18th Street, NW
Washington, DC 20036
202-833-3420

The International Association of Fire Chiefs was organized in 1873 to further the professional advancement of the fire service and to insure and maintain greater protection of life and property from fire. Its purposes are fulfilled by: (1) conducting research and studies of major problems affecting the fire service at community, state, provincial, regional, national, and international levels; (2) developing and implementing an active program vital to the continued well-being of the fire service; (3) serving as the recognized organization for the exchange of ideas, information, knowledge, and experience in areas affecting the safety of life and property from fire; (4) encouraging and developing public education in fire prevention to preserve human life and material resources; and (5) promoting educational programs in the best interests of the fire service.

Executive Committee
Chief Douglas Pollington, President
Cambridge, Ontario, Canada

Chief Gerald A. Carle, First Vice Pres.
Dracut, MA

Chief Ben Vossenaar, Second Vice Pres.
Rotterdam and Regional Fire Brigade
Rozenburg, Netherlands

Chief Albert W. Connors, Treasurer
Farmington Fire Department
Farmington, NM

Chief (Retired) Charles Kamprad
Immediate Past President
St. Charles, MO

Chief Gordon Bentley, Director at Large
Missaissauga, Ontario, Canada

Division Directors
Canadian Division:
Chief Gordon Bentley

Eastern Division:
Chief A. L. Hopson

Great Lakes Division:
Deputy Chief George Danz

Missouri Valley Division:
Chief John H. Otte

New England Division:
Chief Paul J. Roach

Southeastern Division:
Chief Fire Marshal Dan J. Carpenter

Southwestern Division:
Chief Chester A. Shelton

Western Division:
Director Robert H. Ely

International Association of Fire Fighters

1750 New York Avenue
Washington, DC 20006
202-872-8484

Organized in 1918, the IAFF has approximately 175,000 members in the United States and Canada. The IAFF is affiliated with the American Federation of Labor and the Congress of Industrial Organizations in the United States and the Canadian Labour Congress. Any person who is engaged as a permanent and paid employee of a fire department is eligible for active membership through the chartered locals, state or provincial associations, and joint councils. The IAFF Headquarters provides a variety of services to the membership, among which are: technical assistance in the occupational safety and health area; labor relations expertise through in-house personnel and field representatives; an extensive educational seminar program; legislative representation at the national level; and public relations guidance.

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Washington, DC 20006

Alfred K. Whitehead, Secretary-Treasurer
1750 New York Ave.
Washington, DC 20006

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William A. Laird
62 Westmount Bay
Winnipeg, Manitoba, Canada R2J 1Y9

John J. Jennings
130 Bowdoin St., Suite 710
Boston, MA 02108

International Fire Service Training Association

Fire Protection Publications
Oklahoma State University
Stillwater, OK 74078
405-624-5723

The International Fire Service Training Association was founded in 1934, and is organized to develop training materials for the fire service. Committees meet each July in Stillwater to review existing or proposed manuals. All validated manuals are published by the Fire Protection Publications division of Oklahoma State University. IFSTA's objectives are: (1) to develop training materials and visual aids for publication; (2) to add new techniques and developments; (3) to delete obsolete and outmoded methods; (4) to validate training materials for publication; (5) to provide materials for students and instructors to assist in certification; and (6) to upgrade the fire service through training.

Executive Board

Harold R. Mace, Executive Director
Manager, Fire Service Training and Fire Protection Publications
Oklahoma State University

Howard Boyd, IFSTA Chairman
Consultant
Nashville, TN

Marvin L. Austin, IFSTA Executive Sec.
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Texas A&M University

Max McRae
District Chief
Houston Fire Department

Kenneth Stanton
National Automatic Sprinkler Inc.
Indianapolis, IN

Max M. Thomas, Director
Fire Service Training
University of Kansas

International Municipal Signal Association

Box 8249
Fort Worth, TX 76112
401-274-1150

The International Municipal Signal Association was organized in 1896. It is an educational, nonprofit organization dedicated to conveying knowledge, technical information, and guidance to its membership, which consists of municipal signal and communication department heads and their first assistants. The range of communications cover traffic control, fire alarm, and police alarm.

Executive Board

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150 E. Miller St.
Newark, NY 14513

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P.O. Box 401889
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88 Ministerial Dr.
Concord, MA 01742

John Corbett, Third Vice President
Canton, OH

Robert Llewellyn, Executive Director
Box 8249
Fort Worth, TX 76112

WE WANT TO KNOW . . .
if a name, an address, or a phone number has changed; if there's an upcoming event, a new program or course, a new publication being offered. If you have more current information than is contained in this *Almanac*, know something that should be included in this book, or just have something interesting about the fire protection scene that you want to contribute, please let us know. Write: Editor, *Fire Almanac*, NFPA, Batterymarch Park, Quincy, MA 02269. All suggestions will receive our careful attention.

International Society of Fire Service Instructors

20 Main St.
Ashland, MA 07121
617-881-5800

The International Society of Fire Service Instructors was organized in 1960. The Society is comprised of those persons who are responsible for the training of fire officers, fire fighters, and rescue and emergency medical personnel. The mission of the Society is to provide effective and continuous leadership in education and training of the fire service for the protection of life and property against fire, and related manmade or natural disasters.

ISFSI Executive Staff

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Louis Amabili, Past President
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Metropolitan Committee of the International Association of Fire Chiefs

1329 18th Street, NW
Washington, DC 20036
202-833-3420

The Metropolitan Committee of the International Association of Fire Chiefs was organized in 1965. The membership of the Metropolitan Committee is limited to active fire chiefs of cities or jurisdictions having a population of more than 200,000, or a minimum of 400 career members, and who are current members of the International Association of Fire Chiefs. The mission of the Metropolitan Committee is to assist the International Association of Fire Chiefs in developing and propagating policy concerning major fire departments.

Metropolitan Committee Executive Staff

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Chief Jim E. Sparr
Wichita Fire Dept.
455 N. Main, 12th Floor Wichita, KS 67202

National Fire Protection Association

Batterymarch Park
Quincy, MA 02269
617-770-3000

The National Fire Protection Association is an independent, voluntary membership, nonprofit organization. Organized in 1896, the Association has as its mission the safeguarding of man and his environment from destructive fire, using scientific and engineering techniques and education. Activities of NFPA generally fall into two broad, interrelated areas: technical and educational.

The basic technical activity involves development, publication, and dissemination of consensus standards intended to minimize the possibility and effects of fire in all aspects of contemporary activity. More than 2400 individuals serve on the Association's committees, all on a voluntary, unpaid basis, and are responsible for approximately 260 standards.

Continuing efforts are directed at the general public of all ages to educate them in avoiding loss of life and property from fire by abiding by the standards and by making good firesafety habits a way of life. "Learn Not To Burn" is the theme and the teaching goal of the Association's general public education effort. This effort consists of a public service campaign on television and a school curriculum for grades K-8. Its Learn Not To Burn Curriculum is the first professionally developed educational program designed for classroom use in teaching firesafety to children.

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General Manager, Wiring Device Division
Pass and Seymour, Inc.
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Syracuse, NY 13221

International Association of Black Professional Fire Fighters

5332 Kershaw Street
Philadelphia, PA 19131
212-866-6924

The International Association of Black Professional Fire Fighters was formed during the first convention of Black Professional Fire Fighters held in Hartford, Connecticut, October 1, 2, and 3, 1970.

Purpose and Aims

- Create a liaison between black fire fighters across the nation.
- Compile information concerning injustices that exist in the working conditions in the fire service, and to implement action to correct them.
- Collect and evaluate data on all deleterious conditions where minorities exist.
- See that competent Blacks are recruited and employed as fire fighters where they reside.
- Promote interracial programs throughout the fire service.
- Aid in motivating Black Brothers to seek advancement to elevated ranks.

The Organization is a life member of the National Association for the Advancement of Colored People.

Board Members

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Philadelphia, PA 19131

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National Volunteer Fire Council
45 Sussex Drive
Lewes, DE 19958
302-645-3225

The National Volunteer Fire Council was organized in 1976, and is an organization of state fire fighters' associations whose purpose is to represent and pursue the interests of volunteer fire fighters and fire departments throughout the United States. Among its objectives is (1) to provide a forum for the formulation of unified positions concerning developments nationally affecting volunteers, and (2) to support fire prevention education in the lower grades of school systems.

Officers
E. James Monihan, Chairman
45 Sussex Dr.
Lewes, DE 19958

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Dallas, OR 97338

Gus Welter, Secretary
9944 Harriet Ave.
Bloomington, MN 55420

Past Meetings of Organizations with Fire Protection Interests

Conference of Fire Protection Associations (International)

1965 London, England
(organization meeting)
1966 Wiesbaden, Germany
1969 Stockholm, Sweden
1971 San Francisco, CA,
(in conjunction with NFPA Annual Meeting)
1973 Zurich, Switzerland
1975 Amsterdam, The Netherlands
1978 Paris, France
1982 Quincy, MA, USA

Fire Department Instructors' Conference

Held in Memphis, TN, 1939-83.

1984	March 18-22, Cincinnati, OH

International Association of Arson Investigators, Inc. (IAAI)

1949	thru 1964 March, West Lafayette, IN
1965	April 12-16, Ann Arbor, MI
1967	April 23-26, College Park, MD
1968	April 8-12, Columbus, OH
1969	April 14-18, Virginia Beach, VA
1970	April 6-9, Norman, OK
1971	April 25-30, Portland, OR
1972	April 9-14, Cocoa Beach, FL
1973	April 23-27, Des Moines, IA
1974	March 17-21, Austin, TX
1975	April 21-25, Lincoln, NE
1976	April 19-23, Indianapolis, MN
1977	May 1-6, Lansing, MI
1978	April 22-28, Anaheim, CA
1979	May 20-25, Williamsburg, VA
1980	March 10-14, Austin, TX
1981	March 30-April 3, Cherry Hill, NJ
1982	April 25-30, St. Louis, MO
1983	May 23-28, Tucson, AZ
1984	March 10-14, Vancouver, BC, Canada

International Association of Black Professional Fire Fighters

1970	Oct. 1-3, Hartford, CT
1972	Sept. 28-Oct. 2, St. Louis, MO
1974	Sept. 28-Oct. 2, Atlanta, GA
1976	Sept. 24-Oct. 1, San Diego, CA
1978	Sept. 15-22, Washington, DC
1980	Aug. 24-29, Detroit, MI
1982	Aug. 30-Sept. 3, Lexington, KY
1984	Aug. 27-31, Seattle, WA

International Association of Fire Chiefs (IAFC)

1873	Oct. 20-22, Baltimore, MD
1874	Oct. 5-8, St. Louis, MO
1875	Oct. 5-8, New York, NY
1876	Sept. 5-7, Philadelphia, PA
1877	Sept. 4-6, Nashville, TN
1878	Sept. 8-10, Cleveland, OH
1879	Sept. 9-12, Washington, DC
1880	Sept. 14-16, Boston, MA
1881	Sept. 13-15, Richmond, VA
1882	Sept. 12-15, Cincinnati, OH
1883	Oct. 24-27, New Orleans, LA
1884	Sept. 9-12, Chicago, IL
1885	Sept. 8-11, Long Branch, NJ
1886	Aug. 24-27, Providence, RI
1887	Sept. 20-23, Atlanta, GA
1888	Aug. 14-17, Minneapolis, MN
1889	Sept. 10-14, Kansas City, MO
1890	Aug. 19-22, Detroit, MI
1891	Aug. 11-14, Springfield, MA
1892	Oct. 4-7, Louisville, KY
1893	Aug. 22-25, Milwaukee, WI
1894	Aug. 14-17, Montreal, Quebec
1895	Oct. 7-9, Augusta, GA
1896	Aug. 10-12, Salt Lake City, UT
1897	Aug. 17-20, New Haven, CT
1898	Oct. 18-21, St. Louis, MO
1899	Aug. 22-25, Syracuse, NY
1900	Oct. 9-12, Charleston, SC
1901	Aug. 27-29, Indianapolis, IN
1902	Sept. 16-19, New York, NY
1903	Sept. 8-10, Atlantic City, NJ
1904	Sept. 13-15, Chattanooga, TN
1905	Aug. 16-19, Duluth, MN
1906	Oct. 9-12, Dallas, TX
1907	Oct. 8-11, Washington, DC
1908	Aug. 25-29, Columbus, OH
1909	Aug. 17-20, Grand Rapids, MI
1910	Aug. 23-24, Syracuse, NY
1911	Sept. 19-22, Milwaukee, WI
1912	Sept. 17-20, Denver, CO
1913	Sept. 1-6, New York, NY
1914	Oct. 20-23New, Orleans, LA
1915	Aug. 31-Sept. 3, Cincinnati, OH
1916	Aug. 29-31, Providence, RI
1917	Postponed (World War I)
1918	June 4-6, Chicago, IL
1919	June 24-27, Kansas City, MO
1920	July 26-29, Toronto, Ontario
1921	Oct. 11-14, Atlanta, GA
1922	Aug. 15-18, San Francisco, CA
1923	Oct. 23-26, Richmond, VA
1924	Aug. 19-22, Buffalo, NY
1925	Sept. 30-Oct. 2, Louisville, KY
1926	Oct. 19-22, New Orleans, LA
1927	Aug. 9-12, Portland, OR
1928	Oct. 17-20, Philadelphia, PA
1929	Oct. 22-25, Birmingham, AL
1930	Sept. 9-12, Winnipeg, Manitoba

1931	Oct. 14-17, Havana, Cuba
1932	Oct. 18-21, San Diego, CA
1933	Aug. 21-27, Cleveland, OH
1934	Aug. 21-24, Milwaukee, WI
1935	Sept. 24-27, Knoxville, TN
1936	July 28-31, Toronto, Ontario
1937	Oct. 19-22, Oklahoma City, OK
1938	Sept. 27-30, New Orleans, LA
1939	Sept. 20-23, San Francisco, CA
1940	Aug. 5-8, Spokane, WA
1941	Aug. 19-22, Boston, MA
1942	Postponed (World War II)
1943	Aug. 31-Sept. 3, Chicago, IL
1944	Aug. 28-31, Grand Rapids, MI
1945	Postponed (World War II)
1946	July 23-26, Cleveland, OH
1947	Aug. 19-22, New York, NY
1948	Nov. 9-12, Miami, FL
1949	Sept. 26-29, New Orleans, LA
1950	Sept. 12-15, San Francisco, CA
1951	Aug. 14-17, Grand Rapids, MI
1952	Aug. 25-28, Boston, MA
1953	Sept. 15-18, Toronto, Ontario
1954	Oct. 17-21, Houston, TX
1955	Sept. 19-22, Omaha, NE
1956	Nov. 12-15, Miami, FL
1957	Sept. 8-12, New Orleans, LA
1958	Sept. 8-12, Los Angeles, CA
1959	Aug. 31-Sept. 3, Grand Rapids, MI
1960	Sept. 12-15, Rochester, NY
1961	Sept. 26-28, Las Vegas, NV
1962	Sept. 24-27, Toronto, Ontario
1963	Oct. 28-31, Memphis, TN
1964	Oct. 19-22, Houston, TX
1965	Oct. 18-22, Miami, FL
1966	Aug. 22-25, Boston, MA
1967	Sept. 10-14, San Francisco, CA
1968	Sept. 25-Oct. 3, Louisville, KY
1969	Oct. 19-23, Chicago, IL
1970	Aug. 9-13, Seattle, WA
1971	Sept. 19-23, St. Louis, MO
1972	Sept. 10-14, Cleveland, OH
1973	Oct. 20-25, Baltimore, MD
1974	Sept. 15-19, Salt Lake City, UT
1975	Sept. 14-18, Las Vegas, NV
1976	Sept. 19-23, San Antonio, TX
1977	Sept. 25-29, Denver, CO
1978	Sept. 10-14, Cincinnati, OH
1979	Sept. 16-19, Kansas City, MO
1980	Sept. 28-Oct. 1, Miami Beach, FL
1981	Sept. 13-16, St. Louis, MO
1982	Sept. 19-22, Philadelphia, PA
1983	Aug. 28-31, Atlanta, GA
1984	Sept. 30-Oct. 3, Los Angeles, CA

Metropolitan Committee of the IAFC (meets with main IAFC convention each year)

1966	Aug. 22-25, Boston, MA
1967	Sept. 10-14, San Francisco, CA
1968	Sept. 25-Oct. 3, Louisville, KY
1969	Oct. 19-23, Chicago, IL
1970	Aug. 9-13, Seattle, WA
1971	Sept. 19-23, St. Louis, MO
1972	Sept. 10-14, Cleveland, OH
1973	Oct. 20-25, Baltimore, MD
1974	Sept. 15-19, Salt Lake City, UT
1975	Sept. 14-18, Las Vegas, NV
1976	Sept. 19-23, San Antonio, TX
1977	Sept. 25-29, Denver, CO
1978	Sept. 10-14, Cincinnati, OH
1979	Sept. 16-19, Kansas City, MO
1980	Sept. 28-Oct. 1, Miami Beach, FL
1981	Sept. 13-16, St. Louis, MO
1982	Sept. 19-22, Philadelphia, PA
1983	Aug. 28-31, Atlanta, GA
1984	Sept. 30-Oct. 3, Los Angeles, CA

International Association of Fire Fighters (IAFF)

1918	Washington, DC
1919	Portland, OR
1920	St. Louis, MO
1921	Columbus, OH
1922	Tulsa, OK
1923	Montreal, Quebec
1924	Kansas City, MO
1926	Philadelphia, PA
1928	Milwaukee, WI
1930	Halifax, Nova Scotia
1932	San Diego, CA
1934	Cedar Point, OH
1936	Asbury Park, NJ
1938	Atlanta, GA
1940	Des Moines, IA
1942	Columbus, OH
1944	Louisville, KY
1946	Toledo, OH
1948	Houston, TX
1950	Milwaukee, WI
1952	Seattle, WA
1954	Miami, FL
1956	Montreal, Quebec
1958	Wichita, KS
1960	Buffalo, NY
1962	San Antonio, TX

1964	San Diego, CA
1966	Indianapolis, IN
1968	Toronto, Ontario
1970	Miami, FL
1972	Los Angeles, CA
1974	Baltimore, MD
1976	Denver, CO
1978	Las Vegas, NV
1980	Toronto, Ontario
1982	Chicago, IL
1984	Cincinnati, OH
1986	Las Vegas, NV

International Fire Service Training Association (IFSTA)

Since its founding in 1934, IFSTA has met each July in Stillwater, OK. The regular meeting time now is the second full week in July. The next meeting will be July 9-13, 1984.

International Municipal Signal Association

1896	Sept. 15, Brooklyn, NY
1897	No record
1898	No record
1899	No record
1900	Sept. 25-27, Pittsburgh, PA
1901	Sept. 23-24, Niagara Falls, NY
1902	Oct. 7-9, Richmond, VA
1903	Sept. 2-4, Atlantic City, NJ
1904	Sept. 13-14, St. Louis, MO
1905	Aug. 23-25, Erie, PA
1906	Aug. 15-17, New Haven, CT
1907	July 7-9, Norfolk, VA
1908	Aug. 19-21, Detroit, MI
1909	Sept. 14-16, Atlantic City, NJ
1910	Sept. 6-9, Rochester, NY
1911	Sept. 12-15, Atlantic City, NJ
1912	Aug. 27-30, Peoria, IL
1913	Aug. 19-22, Watertown, NY
1914	Sept. 15-18, Atlantic City, NJ
1915	Aug. 24-27, Cincinnati, OH
1916	Aug. 22-25, Baltimore, MD
1917	Sept. 11-14, Niagara Falls, NY
1918	Sept. 24-27, Atlanta, GA
1919	Sept. 23-26, Chicago, IL
1920	Oct. 19-22, New Orleans, LA
1921	Sept. 6-9, Colorado Springs, CO
1922	Aug. 22-25, New Bedford, MA
1923	Sept. 25-28, Reading, PA
1924	Oct. 14-17, Augusta, GA
1925	Aug. 27-30, Detroit, MI
1926	Sept. 21-24, Asheville, NC
1927	Aug. 16-19 , Salt Lake City, UT
1928	Oct. 23-26, New Orleans, LA
1929	Aug. 20-23, Boston, MA
1930	Aug. 12-15, Denver, CO
1931	Oct. 27-30, Jacksonville, FL
1932	Sept. 13-16, St. Louis, MO
1933	Sept. 26-29, Wilkes-Barre, PA
1934	Aug. 29-Sept. 1, Washington, DC
1935	Oct. 14-16, Richmond, VA
1936	Aug. 31-Sept. 3, New York, NY
1937	Aug. 30-Sept. 2, Cleveland, OH
1938	Sept. 12-15, Baltimore, MD
1939	Oct. 9-12, Providence, RI
1940	Oct. 14-17, Jacksonville, FL
1941	Sept. 29-Oct. 2, St. Louis, MO
1942	Oct. 4-7, Philadelphia, PA
1943	Sept. 27-29, Cleveland, OH
1944	Oct. 2-5, Boston, MA
1945	Nov. 12-15, Chicago, IL
1946	Nov. 11-14, Miami, FL
1947	Sept. 29-Oct. 2, Grand Rapids, MI
1948	Oct. 4-7, Buffalo, NY
1949	Oct 10-13, Pittsburgh, PA
1950	Sept. 18-21, New York, NY
1951	Sept. 17-20, San Francisco, CA
1952	Sept. 29-Oct. 2, Boston, MA
1953	Oct. 5-8, Columbus, OH
1954	Oct. 4-7, Atlantic City, NJ
1955	Sept. 26-29, Rochester, NY
1956	Sept. 17-20, Denver, CO
1957	Sept. 16-19, Miami Beach, FL
1958	Oct. 20-23, Philadelphia, PA
1959	Oct. 19-22, Las Vegas, NV
1960	Sept. 19-21, New York, NY
1961	Oct. 9-11, Cincinnati, OH
1962	Sept. 24-26, Montreal, Quebec
1963	Oct. 3-6, Houston, TX
1964	Sept. 27-30, Atlantic City, NJ
1965	Oct. 3-6, Portland, OR
1966	July 31-Aug. 3, Chicago, IL
1967	Aug. 27-30, Baltimore, MD
1968	Aug. 18-21, Denver, CO
1969	Aug. 17-20, Boston, MA
1970	Aug. 2-5, Hollywood, FL
1971	Aug. 15-18, Los Angeles, CA
1972	July 30-Aug. 3, Montreal, Quebec
1973	Aug. 12-16, New Orleans, LA
1974	Sept. 22-26, Las Vegas, NV
1975	July 27-30, Atlantic City, NJ
1976	Aug. 29-Sept. 2, Miami Beach, FL

1977	Aug. 14-17, Baltimore, MD
1978	Aug. 27-31, Dallas, TX
1979	Aug. 10-14, Toronto, Ontario
1980	Aug. 4-8, Philadelphia, PA
1981	July 19-24, Canton, OH
1982	Aug. 8-13, Nashville, TN
1983	Aug. 7-12, Portland, OR
1984	Aug. 12-17, Amherst, NY

International Society of Fire Service Instructors

Fall Conferences

1967	Baton Rouge, LA
1968	Ames, IA
1969	Dover, DE
1970	Clearwater, FL
1971	Memphis, TN
1972	Las Vegas, NV
1973	Morgantown, WV
1974	Anaheim, CA
1975	Boston, MA
1976	Silver Springs, MD
1977	Atlanta, GA
1978	Sioux Falls, SD
1979	Denver, CO
1980	Virginia Beach, VA
1981	Louisville, KY
1982	Hartford, CT
1983	Camp Hill, PA
1984	Houston, TX
1985	Boston, MA

National Fire Protection Association (NFPA)

Annual and Fall Meetings
(Annual Meetings in May)

1896	Nov. 6 (Org.), New York, NY
1897	May 19-20, New York, NY
1898	June 7-9, Chicago, IL
1899	June 13-15, Boston, MA
1900	June 26-28, New York, NY
1901	June 11-13, Chicago, IL
1902	May 13-15, Philadelphia, PA
1903	May 25-28, Chicago, IL
1904	May 24-26, New York, NY
1905	May 23-25, New York, NY
1906	May 22-24, Chicago, IL
1907	May 22-24, New York, NY
1908	May 26-28, Chicago, IL
1909	May 25-27, New York, NY
1910	May 17-19, Chicago, IL
1911	May 23-25, New York, NY
1912	May 14-16, Chicago, IL
1913	May 13-15, New York, NY
1914	May 5-7, Chicago, IL
1915	May 11-13, New York, NY
1916	May 9-11, Chicago, IL
1917	May 8-10, Washington, DC
1918	May 7-9, Chicago, IL
1919	May 6-8, Ottawa, Ontario
1920	May 4-6, Chicago, IL
1921	June 14-16, San Francisco, CA
1922	May 9-11, Atlantic City, NJ
1923	May 8-10, Chicago, IL
1924	May 13-15, Atlantic City, NJ
1925	May 12-14, Chicago, IL
1926	May 10-13, Atlantic City, NJ
1927	May 9-12, Chicago, IL
1928	May 7-10, Atlantic City, NJ
1929	May 13-16, Memphis, TN
1930	May 12-15, Atlantic City, NJ
1931	May 11-14, Toronto, Ontario
1932	May 9-12, Atlantic City, NJ
1933	May 29-June 1, Milwaukee, WI
1934	May 14-17, Atlantic City, NJ
1935	May 13-16, Atlanta, GA
1936	May 11-14, Atlantic City, NJ
1937	May 10-14, Chicago, IL
1938	May 9-12, Atlantic City, NJ
1939	May 8-12, Chicago, IL
1940	May 7-11, Atlantic City, NJ
1941	May 12-16, Toronto, Ontario
1942	May 11-14, Atlantic City, NJ
1943	May 10-13, Chicago, IL
1944	May 8-11, Philadelphia, PA
1945	June 26, Boston, MA
1946	June 3-7, Boston, MA
1947	May 26-29, Chicago, IL
1948	May 10-13, Washington, DC Oct. 28-29, Hartford, CT
1949	May 16-19, San Francisco, CA Nov. 1-2, Buffalo, NY Nov. 29-30, Atlanta, GA
1950	May 15-18, Atlantic City, NJ Nov. 15-17, St. Paul, MN Nov. 28-30, Dallas, TX
1951	May 7-11, Detroit, MI Oct. 24-25, Portland, OR Oct. 29-30, Los Angeles, CA
1952	June 9-13, New York, NY Dec. 1-3, Houston, TX
1953	May 11-15, Chicago, IL Oct. 29-30, Providence RI
1954	May 17-21, Washington, DC Sept. 20-22, Seattle, WA

1955	May 16-20, Cincinnati, OH Nov. 28-30, New Orleans, LA
1956	June 4-8, Boston, MA Nov. 26-28, St. Louis, MO
1957	May 20-24, Los Angeles, CA Nov. 18-20, Richmond, VA
1958	May 19-23, Chicago, IL Nov. 17-19, Pittsburgh, PA
1959	June 1-5, Atlantic City, NJ Nov. 11-13, Des Moines, IA
1960	May 16-20, Montreal, Quebec Nov. 14-16, Columbus, OH
1961	May 15-19, Detroit, MI Oct. 30-Nov. 1, Kansas City, MO
1962	May 21-25, Philadelphia, PA Oct. 15-17, Minneapolis, MN
1963	May 13-17, Portland, OR Dec. 2-4, Rochester, NY
1964	May 18-22, Dallas, TX Oct. 12-14, Louisville, KY
1965	May 17-21, Washington, DC Nov. 15-17, Los Angeles, CA
1966	May 16-20, Chicago, IL Nov. 14-16, Raleigh, NC
1967	May 15-19, Boston, MA Nov. 13-15, Omaha, NE
1968	May 20-24, Atlanta, GA Nov. 19-21, Milwaukee, WI
1969	May 12-16, New York, NY Nov. 18-20, Denver, CO
1970	May 18-22, Toronto, Ontario Nov. 17-19, Nashville, TN
1971	May 17-21, San Francisco, CA Nov. 16-18, Cleveland, OH
1972	May 15-19, Philadelphia, PA Nov. 14-16, New Orleans, LA
1973	May 14-18, St. Louis, MO Oct. 15-17, Geneva, Switz.
1974	May 20-24, Miami Beach, FL Nov. 19-21, Seattle, WA
1975	May 12-16, Chicago, IL Nov. 18-20, Pittsburgh, PA
1976	May 17-21, Houston, TX Nov. 15-18, Cincinnati, OH
1977	May 16-20, Washington, DC Nov. 14-17, Atlanta, GA
1978	May 15-19, Anaheim, CA Nov. 13-16, Montreal, Quebec
1979	May 14-18, St. Louis, MO Nov. 12-15, Phoenix, AZ
1980	May 19-23, Boston, MA Nov. 17-20, San Diego, CA
1981	May 18-21, Dallas, TX Nov. 16-19, Toronto, Ontario
1982	May 17-21, San Francisco, CA Nov. 15-18, Philadelphia, PA
1983	May 16-20, Kansas City, MO Nov. 14-17, Orlando, FL
1984	May 21-24, New Orleans, LA Nov. 12-15, San Diego, CA

National Volunteer Fire Council

1976	March 15-16, Memphis, TN
1977	March 19-20, Fort Mitchell, KY
1978	March 11-12, Hempstead, NY
1979	March 3-4, Grand Prairie, TX
1980	March 1-2, Austintown, OH
1981	April 11-12, West Des Moines, IA
1982	April 3-4, Edinburg, TX
1983	Sept. 30-Oct. 1-2, Seattle, WA
1984	April 13-15, S. Sioux City, NE

Society of Fire Protection Engineers (SFPE)

1951	May 8, Detroit, MI
1952	June 12, New York, NY
1953	May 21, Chicago, IL
1954	May 20, Washington, DC
1955	May 19, Cincinnati, OH
1956	June 5, Boston, MA
1957	May 21, Los Angeles, CA
1958	May 20, Chicago, IL
1959	June 3, Atlantic City, NJ
1960	May 18, Montreal, Quebec
1961	May 17, Detroit, MI
1962	May 23, Philadelphia, PA
1963	May 15, Portland, OR
1964	May 20, Dallas, TX
1965	May 19, Washington, DC
1966	May 18, Chicago, IL
1967	May 17, Boston, MA
1968	May 22, Atlanta, GA
1969	May 14, New York, NY
1970	May 21, Toronto, Ontario
1971	May 19, San Francisco, CA
1972	May 17, Philadelphia, PA
1973	May 16, St. Louis, MO
1974	May 22, Miami Beach, FL
1975	May 14, Chicago, IL
1976	May 19, Houston, TX
1977	May 19, Washington, DC
1978	May 16, Anaheim, CA
1979	May 15, St. Louis, MO
1980	May 21, Boston, MA
1981	May 20, Dallas, TX
1982	May 19, San Francisco, CA
1983	May 18, Kansas City, MO
1984	May 21-23, New Orleans, LA

Organizations with Fire Protection Interests

Insurance Organizations

Alliance of American Insurers
20 North Wacker Dr.
Chicago, IL 60606
Paul S. Wise, President

American Hull Insurance Syndicate
14 Wall St.
New York, NY 10005
Allen E. Schumacher, Chairman of Board and Manager

American Institute of Marine Underwriters
14 Wall St.
New York, NY 10005
Thomas A. Fain, President

American Insurance Association
85 John St.
New York, NY 10038
T. Lawrence Jones, President

American Nuclear Insurers
270 Farmington Ave., Suite 245
Farmington, CT 06032
Burt C. Proom, President

Association of Mill and Elevator Mutual Insurance Companies
2 North Riverside Plaza
Chicago, IL 60606
D. D. Mauger, President and Secretary

Assurex International
6500 Busch Blvd.
Columbus, OH 43229
Gordon E. Noble, President

Cotton Fire and Marine Underwriters
1810 Commerce St.
P.O. Box 1849
Dallas, TX 75221
Walter H. McClain, Manager

Factory Mutual System
1151 Boston-Providence Turnpike
Norwood, MA 02062
J. A. Love, President

G.A.B. Business Services Inc.
123 William St.
New York, NY 10038
I. E. Williamson, Chairman

IRM
15 North Broadway
White Plains, NY 10038
Lovell M. Bolz, President

Independent Insurance Agents of America
100 Church St.
New York, NY 10007
Jeffrey M. Yates, Exec. V.P.

Industrial Risk Insurers
85 Woodland St.
Hartford, CT 06102
J. W. Cates, President

Insurance Information Institute
100 N. Interregional, Suite 3200
Austin, TX 78701
Mechlin D. Moore, President

Insurance Institute for Highway Safety
600 New Hampshire Ave., Suite 300
Washington, DC 20037
William Haddon, Jr., President

Insurance Services Office
160 Water St.
New York, NY 10038
Daniel J. McNamara, President

Mill Mutual Fire Prevention Bureau
2 North Riverside Plaza
Chicago, IL 60606
James P. Corcoran, Manager

Mutual Atomic Energy Liability Underwriters
One E. Wacker Dr.
Chicago, IL 60601
Ambrose B. Kelly, Manager

Mutual Reinsurance Bureau
1550 Pearl St.
P.O. Box 188
Belvidere, IL 61008
Walter Schiltz, President

National Association of Insurance Brokers, Inc.
Suite 700, 311 First St., NW.
Washington, DC 20001
Donald Jordan, Exec. Director

National Association of Insurance Commissioners
350 Bishops Way
Brookfield, WI 53005
Jan S. Hanson, Exec. Secretary

National Association of Mutual Insurance Companies
3707 Woodview Terrace, Box 68700
Indianapolis, IN 46268
Harold W. Walters, President

National Automobile Theft Bureau
10330 S. Roberts Rd.
Palos Hills, IL 60482
Paul W. Gilliland, President

National Cargo Bureau, Inc.
Suite 2757
One World Trade Center
New York, NY 10048
T. O. Clark, Chairman

Professional Insurance Agents
400 N. Washington St.
Alexandria, VA 22314
Trevor A. White, Exec. V.P.

Property Loss Research Bureau
20 N. Wacker Dr.
Chicago, IL 60606
John Wrend, V. Pres. & Sec-Mgr.

National Fire Service Organizations

Fire Marshals Association of North America (an NFPA Section)
600 Maryland Ave., SW
Washington, DC 20024
Robert B. Smith, Executive Secretary

Fire Service Section (an NFPA Section)
Batterymarch Park
Quincy, MA 02269
James V. McKiernan, Executive Secretary

International Association of Arson Investigators
P.O. Box 600
25 Newton St.
Marlboro, MA 01752
Robert E. May, Executive Secretary

International Association of Black Professional Fire Fighters
Office of the President
c/o New York Fire Department
24 Humboldt St.
Brooklyn, NY 11206
David J. Floyd, President

International Association of Fire Chiefs
1329 18th St., NW
Washington, DC 20036
Donald D. Flinn, General Manager

International Association of Fire Fighters
1750 New York Ave., NW
Washington, DC 20006
John A. Gannon, President

International Fire Service Training Association
Oklahoma State University
Stillwater, OK 74078
Gene P. Carlson, Mng. Editor

International Municipal Signal Association
P.O. Box 8249
Fort Worth, TX 76112
Robert J. Llewellyn, Executive Director

International Society of Fire Service Instructors
20 Main St.
Ashland, MA 01721
Edward J. McCormack, Jr., Executive Director

Joint Council of National Fire Service Organizations
National Fire Protection Association
Batterymarch Park
Quincy, MA 02269
Joseph M. Redden, Secretary

National Association of Fire Investigators
53 West Jackson Blvd., Suite 300
Chicago, IL 60604
John Kennedy, President

National Volunteer Fire Council
142 West River St.
Rockton, IL 61072
James Monihan, Chairman

Fire Research and Testing Laboratories

Factory Mutual Research Corporation
1151 Boston-Providence Turnpike
Norwood, MA 02062
J. A. Love, President

Southwest Research Institute
6220 Culebra Rd.
San Antonio, TX 78284

National Bureau of Standards
Center for Fire Research
Gaithersburg, MD
Jack Snell, Director

Ohio State University
Columbus, OH

Underwriters Laboratories, Inc.
333 Pfingsten Rd.
Northbrook, IL 60062
J. A. Bono, President

U.S. Government Organizations

Agriculture, Department of
14th and Independence Ave., SW
Washington, DC 20250
John R. Block, Secretary

Commerce, Department of
14th and Constitution Ave., NW
Washington, DC 20230
Malcolm Baldrige, Secretary

Communications Commission, Federal
1919 M St., NW
Washington, DC 20554
Mark S. Fowler, Chairman

Consumer Product Safety Commission
1111 18th St., NW
Washington, DC 20207
Nancy Harvey Steorts, Chairman

Defense, Department of
The Pentagon
Washington, DC 20301
Caspar W. Weinberger, Secretary

Education, Department of
400 Maryland Ave., SW
Washington, DC
Terrel H. Bell, Secretary

Emergency Management Agency, Federal
1725 Eye St., NW
Washington, DC 20472
Louis O. Guiffrida, Director

Energy, Department of
1000 Independence Ave., SW
Washington, DC 20585
Donald P. Hodel, Secretary

Environmental Protection Agency
401 M St., NW
Washington, DC 20460
Ann McGill Gorsuch, Administrator

General Services Administration
18th and F Sts., NW
Washington, DC 20405
Gerald P. Carmen, Administrator

Health and Human Services, Department of
200 Independence Ave., SW
Washington, DC 20201
Richard S. Schweiker, Secretary

Housing and Urban Development, Department of
451 Seventh St., SW
Washington, DC 20410
Samuel R. Pierce, Jr., Secretary

Interior, Department of
C Street, between 18th and 19th St., NW
Washington, DC 20240
James G. Watt, Secretary

Justice, Department of
10th St. Constitution Ave., NW
Washington, DC 20240
William French Smith, Attorney General

Labor, Department of
200 Constitution Ave., NW
Washington, DC 20503
Raymond J. Donovan, Secretary

National Aeronautics and Space Administration
400 Maryland Ave., SW
Washington, DC 20546
James M. Beggs, Administrator

Nuclear Regulatory Commission
1717 H St., NW
Washington, DC 20555
Nunzio J. Pallidino, Chairman

Small Business Administration
1441 L St., NW
Washington, DC 20416
James C. Sanders, Administrator

Transportation, Department of
400 Seventh St., SW
Washington, DC 20590
Andrew L. Lewis, Secretary

Transportation Safety Board, National
800 Independence Ave., SW
Washington, DC 20594
James E. Burnett, Chairman

Treasury, Department of
15th St. and Pennsylvania Ave., NW
Washington, DC 20220
Donald T. Regan, Secretary

Veterans Administration
810 Vermont Ave., NW
Washington, DC 20420
Robert P. Nimmo, Administrator

Industrial Trade Associations

Air Conditioning and Refrigeration Institute
1815 North Fort Myer Dr.
Arlington, VA 22209
Richard C. Schulze, President

American Gas Association
1515 Wilson Blvd.
Arlington, VA 22209
George H. Lawrence, President

American HardBoard Association
887-B Wilmette Rd.
Palatine, IL 60067
James E. Nolan, Executive Vice President

American Iron and Steel Institute
1000 16th St., NW
Washington, DC 20036
Robert B. Peabody, President

American Petroleum Institute
2101 L St., NW
Washington, DC 20037
Charles J. DiBona, President

American Warehousemen's Association
1165 N. Clark St.
Chicago, IL 60610
Jerry Leatham, President

American Wood Preserves Institute
1651 Old Meadow Rd.
McLean, VA 22101
Theodore J. Duke, President

Asphalt Roofing Manufacturers Association
1800 Massachusetts Ave., SW, Suite 702
Washington, DC 20036
Richard D. Snyder, Exec. V.P.

Automatic Fire Alarm Association
149 California St.
Newton, MA 02158
Martin Reiss, President

Builders Hardware Manufacturers Association
60 E. 42nd St.
New York, NY 10017
J. Dudley Waldner, Executive Director

Canadian Automatic Sprinkler Association
3638 Victoria Park Ave.
Willowdale, Ontario, Canada M2H 3B2

Canadian Sheet Steel Building Institute
305-201 Consumers Rd.
Willowdale, Ontario, Canada M2J 4G8

Canadian Wood Council
85 Albert St.
Ottawa, Ontario, Canada K1P 6A4

Central Station Electrical Protection Association
1000 Vermont Ave., N.W.
Washington, DC 20005
Robert J. Daugherty, Executive Director

Chemical Manufacturers Association
2501 M St., NW
Washington, DC 20037
Robert A. Roland, President

Chemical Specialties Manufacturers Association, Inc.
1001 Connecticut Ave., NW
Washington, DC 20036
Ralph Engel, President

Chlorine Institute, Inc.
342 Madison Ave.
New York, NY 10017
Robert L. Mitchell, Jr., Executive Director

Compressed Gas Association, Inc.
1235 Jefferson Davis Hgwy
Arlington, VA 22202
Bernard K. Kuehn, President

Computer and Business Equipment Manufacturers Association
311 First St., N.W.
Washington, DC 20001
Vico E. Henriques, President

Corn Refiners Association, Inc.
1001 Connecticut Ave., N.W.
Washington, DC 20036
Robert C. Liebenow, President

Distilled Spirits Council of the United States, Inc.
1300 Pennsylvania Bldg.
Washington, DC 20004
Frederick A. Meister, Jr., President

Door and Hardware Institute
1815 North Ft. Myer Dr.
Rosslyn, VA 22209
Richard M. Hornaday, Executive Vice President

Ductile Iron Pipe Research Association
1301 W. 22nd St., Suite 509
Oak Brook, IL 60521
Troy F. Stroud, President

Electric & Electronic Manufacturing Association of Canada
One Yonge St., Suite 1608
Toronto, Ontario, Canada M5E 1R1

Fire Apparatus Manufacturers Division Truck Body and Equipment Association
5530 Wisconsin Ave., NW
Washington, DC 20015
Berkley C. Sweet, President

Fire Equipment Manufacturers Association
1230 Keith Bldg.
Cleveland, OH 44115
John H. Addington, Executive Director

Fire Equipment Manufacturers Institute of Canada
P.O. Box 73
Mississauga, Ontario, Canada L5G 4L5

Forging Industry Association
1121 Illuminating Bldg.
Cleveland, OH 44113
Robert W. Atkinson, Executive Vice President

Gas Appliance Manufacturers Association, Inc.
1901 North Fort Myer Dr.
Arlington, VA 22209
Harry A. Paynter, President

Gypsum Association
1603 Orrington Ave.
Evanston, IL 60201
A. Victor Abnee, Jr., Executive Director

Hardwood Plywood Manufacturers Association
P.O. Box 2789
Reston, VA 22090
Clark E. McDonald, Managing Director

Hydraulic Institute
712 Lakewood Center N.
Cleveland, OH 44107
Allen P. Wherry, Secretary-Treasurer

Industrial Heating Equipment Association
1901 N. Moore St., #509
Arlington, VA 22209
James H. Houston, Executive Vice President

Industrial Truck Association
1326 Freeport Rd.
Pittsburgh, PA 15238
L. West Shea, Managing Director

Institute of Makers of Explosives
1575 Eye St., NW, Suite 550
Washington, DC 20005
P. Frederick Smith, Jr., Executive Director

International Association of Refrigerated Warehouses
7315 Wisconsin Ave.
Bethesda, MD 20814
Richard M. Powell, President

Laundry and Cleaners Allied Trades Association
543 Valley Rd.
Upper Montclair, NJ 07043
Robert C. Knipe, Executive Director

Material Handling Institute, Inc.
1326 Freeport Rd.
Pittsburgh, PA 15238
Philip Trimble, Managing Director

Metal Building Manufacturers Association
2130 Keith Building
Cleveland, OH 44115
Charles M. Stockinger, General Manager

Motor Vehicle Manufacturers Association of the United States, Inc.
300 New Center Bldg.
Detroit, MI 48202
V. J. Adduci, President

National American Wholesale Grocers Association, Inc.
51 Madison Ave.
New York, NY 10010
Gerald E. Peck, President

National Association of Electrical Distributors
600 Summer St.
Stamford, CT 06901
Arthur W. Hooper, Executive Director

National Association of Fire Equipment Distributors, Inc.
111 East Wacker Dr.
Chicago, IL 60601
Walter G. Purcell, Executive Director

National Association of Home Builders Technical Service
15th & M Sts., NW
Washington, DC 20005
David E. Stahl, Executive Vice President

National Fire Sprinkler Association
P.O. Box 1000
Rt. 22 & Robin Hill Corp Park
Patterson, NY 12563
Edward J. Reilly, President

National Burglar and Fire Alarm Association, Inc.
1133 15th St, NW, Suite 1000
Washington, DC 20005
Richard M. Bugbee, Executive Director

National Electrical Manufacturers Association
2101 L St., NW
Washington, DC 20037
Bernard Falk, President

National Forest Products Association
1619 Massachusetts Ave., NW
Washington, DC 20036
Ralph D. Hodges, Executive Vice President

National LP-Gas Association, Inc.
1301 W. 22nd St.
Oak Brook, IL 60521
J. D. Capps, Executive Vice President

National Machine Tool Builders' Association
7901 Westpark Dr.
McLean, VA 22101
James A. Gray, President

National Oil Jobbers Council
1707 H St.
Washington, DC 20006
Phillip R. Chisholm, Executive Vice President

National Paint & Coatings Association, Inc.
1500 Rhode Island Ave., NW
Washington, DC 20005
Larry L. Thomas, Executive Director

National Restaurant Association
311 First St., N.W.
Washington, DC 20001
Robert E. Bradford, President

National School Supply and Equipment Association
1500 Wilson Blvd.
Arlington, VA 22209
Dave McCurrach, Executive Vice President

National Tank Truck Carriers, Inc.
1616 P St., NW
Washington, DC 20006
Clifford J. Harvison, Managing Director

National Woodwork Manufacturers Association, Inc.
205 West Touhy Ave.
Park Ridge, IL 60068
John W. Shoemaker, Executive Vice President

Portland Cement Association
5420 Old Orchard Rd.
Skokie, IL 60077
Richard E. Reuss, President

Power Tool Institute, Inc.
5105 Tollview Dr.
Rolling Meadows, IL 60008
James E. Bates, Executive Manager

Rubber Manufacturers Association, Inc.
1901 Pennsylvania Ave., NW
Washington, DC 20006
Donald G. Brotzman, President

Society of the Plastics Industry
355 Lexington Ave.
New York, NY 10017
G. R. Munger, President

Sporting Arms and Ammunition Manufacturer's Institute
P.O. Box 218
Wallingford, CT 06492
Harry L. Hampton, Jr., Exec. Director

Steel Tank Institute
666 Dundee Rd.
Northbrook, IL 60062
Emily E. Schieding, Exec. Director

Terminal Elevator Grain Merchants' Association
Box 15004 Commerce Station
Minneapolis, MN 55415
Pete Stallcop, Executive Vice President

Thermal Insulation Manufacturing Association
7 Kirby Plaza
Mt. Kisco, NY 10549
James M. Barnhart, Executive Director

Presidents and Chief Officers of Fire Protection Associations

Conference of Fire Protection Associations (International)

Robert W. Grant, Chairman (CFPA)
National Fire Protection Association
Batterymarch Park
Quincy, MA 02269
(617) 770-3000

Philippe de Moulins, Secretary
c/o Centre National de Prevention et de Protection
5 Rue Daunou
75002 Paris, France

Fellowship of Christian Fire Fighters

Fellowship of Christian Fire Fighters International
P.O. Box 9324
Denver, CO 80209

Duncan M. Wilkie, President
6467 Windfield Ave.
Parker, CO 80134

Robert W. Crum, Secretary
1464 So. Decatur St.
Denver, CO 80219

John R. Barker, Treasurer
3460 S. Ivy Way
Denver, CO 80222

Fire Marshals Association of North America

(The Fire Marshals Section of the National Fire Protection Association)

Howard H. Summers, Jr., President
Chief Fire Marshal
Office of the State Fire Marshal
Virginia Dept. of Housing and Community Development
205 North Fourth St.
Richmond, VA 23219

Chief W.W. Golden, First Vice President
Bureau of Fire Prevention
1001 Senate St.
Columbia, SC 29201

Capt. William R. Rucinski, Second Vice President
Chief, Fire Marshal Division
Michigan Dept. of State Police
General Office Building
7150 Harris Dr.
Lansing, MI 48913

Marty Richard, Secretary
Fire Marshal
City of Reno Fire Department
Fire Prevention Bureau
200 Evans Ave.
Reno, NV 89501

Robert B. Smith, Executive Secretary
c/o National Fire Protection Association
Capital Gallery, Suite 220
600 Maryland Ave., SW
Washington, DC 20024
(202) 484-8200

International Association of Arson Investigators

Louis H. Taranto, Past President
c/o New Jersey State Police
P.O. Box 248
Island Heights, NJ 08732

Robert Doran, President
c/o Nassau County Fire Marshal's Office
899 Jerusalem Ave.
Uniondale, NY 11553

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New York State Association of Fire Chaplains, Inc.
1644 Genesee St.
Utica, NY 13502
(315) 773-4461

Rev. Alan Carvalho, President
Alan B. Peabody, Executive Secretary

In colonial days, fire stations were made of wood and resembled garden toolsheds. The town's fire engines, hooks, and ladders were stored in these early stations.

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Society of Fire Protection Engineers

Organized in 1950, the Society of Fire Protection Engineers (SFPE), with headquarters at 60 Batterymarch St., Boston, MA 02110, is the professional society for engineers involved in the multi-faceted field of fire protection engineering. The purposes of the Society are to advance the art and science of fire protection engineering and its allied fields, to maintain a high ethical standing among its members, and to foster fire protection engineering education. Its worldwide members include engineers in private practice, in industry, in local, regional, and national government, as well as technical members of the insurance industry. Thirty-five chapters of the Society are located in the United States, Canada, Europe, and Australia. Current membership is 3,000.

Membership in the Society is open to those possessing engineering or physical science qualifications coupled with experience in the field and to those in associated professional fields.

The Society serves as an international clearinghouse for fire protection engineering state-of-the-art advances and information. It publishes the *SFPE Bulletin*, a newsletter with regular features, and a series of "Technology Reports" covering technical developments of interest to the engineering community. It also publishes occasional special reports.

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Building Code Organizations

In the United States today, there are essentially three major model building code organizations. Each organization publishes a "nationally recognized" building code. All three organizations are membership organizations comprised of representatives of state and local governmental units and associated interests from all segments of the building community.

Building Officials and Code Administrators International, Inc. (BOCA)

4051 West Flossmor Rd.
Country Club Hills, IL 60477
(312) 799-2300

BOCA Codes primarily used in the northeast and midwest.
President: Chester Ponza (Amherst, MA)
Chief Executive Officer: Clarence Bechtel, Executive Director.
Major publications include:
Basic/National Building Code
Basic/National Fire Prevention Code
Basic/National Mechanical Code
Basic/National Plumbing Code
Basic/National Existing Structures Code
Bi-monthly Magazine: "The Building Official and Code Administrator," available to members and to others on a subscription basis.
Annual Meeting: June
Mid-Winter Meeting: January
Regional Offices:
3021 East Dublin-Granville Rd.
Columbus, OH 43229
(614) 890-1064

137 Ellison St.
Paterson, NJ 07505
(201) 523-1919

231G South Garnett Rd., Suite I
Tulsa, OK 74129
(918) 664-4434

International Conference of Building Officials (ICBO)

5360 S. Workman Mill Rd.
Whittier, CA 90601
(213) 699-0541

ICBO Codes primarily used in the west and midwest.
President: H.T. Wiedenman, Des Moines, IA (term expires Fall 1983)
Chief Executive Officer: James E. Bihr, Executive Director
Major publications include:
Uniform Building Code
Uniform Fire Code (Published jointly with Western Fire Chiefs Assoc.)
Uniform Mechanical Code (Published jointly with Int. Assoc. of Plumbing and Mechanical Officials)

Uniform Plumbing Code (Published jointly with Int. Assoc. of Plumbing and Mechanical Officials)
Uniform Housing Code
Uniform Code for the Abatement of Dangerous Buildings
Uniform Building Security Code

Bi-monthly Magazine: "Building Standards," available to members and on a subscription basis.
Annual Meeting: Usually late September or early October.
Regional Offices:
17544 Midvale Ave., N., Suite 304
Seattle, WA 98133
(206) 542-9421

6738 NW Tower Dr.
Kansas City, MO 64151
(816) 741-2241

Southern Building Code Congress International, Inc. (SBCCI)

900 Montclair Rd.
Birmingham, AL 35213
(205) 591-1853

Codes primarily used in the south.
President: Christ T. Sanidas, Shelby County, TN
Chief Executive Officer: William J. Tangye, Executive Director
Major publications include:
Standard Building Code
Standard Fire Prevention Code
Standard Gas Code
Standard Mechanical Code
Standard Plumbing Code
Standard Housing Code
Standard Code for the Elimination or Repair of Unsafe Buildings
Standard for the Installation of Roof Coverings
Standard for the Installation of Proscenium Curtains
Bi-monthly Magazine: "Southern Building," available to members only.
Annual Meeting: October

The three model building code organizations formed the Council of American Building Officials (CABO) in 1972 for the purpose of representing the building official at the national level, developing uniform procedures for recognition of new products, materials and systems, recommending and promoting adoption of model codes and related documents, encouraging uniformity in administration of building regulations, and promoting the use of educational services available from the model code organizations.

CABO sponsors the Board for the Coordination of the Model Codes (BCMC) which consists of representatives from the three model building code organizations and from the National Fire Protection Association. The purpose of BCMC is to identify and make recommendations for the elimination of conflicts between the model building codes and the *Life Safety Code*®, NFPA *101*® and other national standards, and to identify those areas where existing conflicts cannot be resolved and recommend changes as may be necessary. In addition, CABO operates a certification program for building officials and the National Research Board that deals with product approval.

Council of American Building Officials (CABO)
5205 Leesburg Pike, Suite 1201
Falls Church, VA 22041
(703) 931-4533

Chief Executive Officer: Richard Kuchnicki, Executive Director
The Council reports through the model code groups.
Major publications include:
The One- and Two-Family Dwelling Code
Model Energy Code and Recommended Requirements to Code Officials
for Solar Heating, Cooling and Hot Water Systems.
Annual Meeting: April

Chairman: John F. Behrens (Huntington Beach, CA), NFPA
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Charles Gillett (Arapahoe County, CO), ICBO
Joseph E. Johnson (Hilton Head, SC), NFPA
Thomas M. Moses (Reedy Creek Improvement District, FL), SBCCI
Victor L. Taugher (Alameda County, CA), ICBO
Martin P. Walsh (St. Louis, MO), BOCA
Edward L. Woods (Mecklenburg County, NC), SBCCI

Secretary: Paul K. Heilstedt, BOCA
Staff Liaisons: James K. Lathrop, NFPA
Jon Traw, ICBO
Gary Walker, SBCCI
NOTE: This list comprises BCMC membership list as of Fall 1983.

Burn Care Services in North America

The following list includes hospitals in the United States at which specialized burn care is provided. About 75 percent of these hospitals have special units set aside for care of the the most severely burned patients. Virtually every hospital on the list also provides burn treatment in other settings, including intensive care units, general medical/surgical units, and outpatient settings.

The list is drawn from the 1983 annual survey made by the American Burn Association. In recent years, the number of specialized burn care services reported to the ABA has stabilized, after a period of steady growth between 1965 and 1980. Many hospitals have expanded their burn units during this period, bringing the number of specialized burn care beds to slightly over 1,800 as of 1983.

Telephone numbers are listed to facilitate referrals of burn patients. Such referrals are normally made by a physician at the community hospital where a patient is first brought following the burn injury. Burn centers generally prefer that the decision to transfer a patient be made at a nearby hospital rather than at the scene of the accident. This helps assure that all necessary care is provided as quickly and as close to the patient's home as is possible. The numbers listed may be located at the hospital switchboard, the emergency department, the burn care unit itself, or the personal office of the physician, depending on which number provides the best access to the physician.

The column that lists the number of burn beds in some cases is filled by an asterisk. This indicates that, while the hospital reports the presence of a team of burn care specialists, it does not have a special area specifically reserved for burn care. The number of beds devoted to burn care at these hospitals will vary depending on the burn patient census.

The physicians listed as "burn service medical directors or M.D.'s most active in burn treatment" are plastic surgeons or general surgeons with a special interest in burn care. This is not usually a full-time commitment: a 1976 survey of burn physicians indicated that burn specialists on the average devote about 30 percent of their practice to burn care.

The facilities listed reported about 22,000 burn admissions in 1982. This represents about 30 percent of the estimated 75,000 annual burn admissions in the United States and Canada. U.S. survey respondents also reported an estimated 4,000 reconstructive burn admissions for subsequent surgical procedures. The total number of such admissions, which are often treated by a different group of physicians, is unknown.

WE WANT TO KNOW . . .
if a name, an address, or a phone number has changed; if there's an upcoming event, a new program or course, a new publication being offered. If you have more current information than is contained in this *Almanac*, know something that should be included in this book, or just have something interesting about the fire protection scene that you want to contribute, please let us know. Write: Editor, *Fire Almanac*, NFPA, Batterymarch Park, Quincy, MA 02269. All suggestions will receive our careful attention.

BURN CARE SERVICES IN THE UNITED STATES

Source: American Burn Association

State	City	Hospital	Telephone Number for Patient Referral	Special Burn Beds	Burn Service Medical Director or M.D.s Most Active in Burn Treatment
Alabama	Birmingham	U. of Alabama Hospitals	205/934-3411	13	Alan R. Dimick
		Children's Hospital	205/933-4000	12	Marshall Pitts
	Mobile	U. of So. Alabama M.C. Hospital	205/473-7000	7	Clifford Dasio
					Mary Finn
					Arnold Luterman
					Max Ramenofsky
Alaska	Anchorage	Providence Hospital	907/276-4511	10	Paul Steer
					W.J. Mills (hypothermia)
	Fairbanks	Fairbanks Memorial Hospital	907/452-8181	5*	William Wennen
Arizona	Phoenix	Maricopa County Gen. Hosp.	602/267-5700	20	John M. Stein
	Tucson	St. Mary's Hospital	602/795-8700	9	Philip Fleishman
Arkansas	Little Rock	Arkansas Children's Hospital	501/370-1100 Ext. 149	14	Fred T. Caldwell
					John Crabtree
California	Berkeley	Alta Bates Hospital	415/540-1573	6	Jerold Z. Kaplan
	Castro Valley	Eden Hospital	415/537-1234	6	Ronald Iverson
					Eleanor Kohn
	Chico	Chico Comm. Mem. Hosp.	916/345-2411 or 916/342-7513	6	Donald J. Mangus
	Culver City	Brotman Medical Center	213/652-6630	5	Arthur M. Kahn
	Downey	Rancho Los Amigos Hospital	213/922-7454	12*	G. Brody et al (reconstructive only)
	Eureka	St. Joseph's Hospital	707/443-8051	*	Russell Pardoe
	Fresno	Valley Medical Center	209/453-4161	6	Steven N. Parks
	Los Angeles	LAC/USC Medical Center	213/226-7991	37	Bruce E. Zawacki
	Orange	U. of C. Irvine Med. Ctr.	714/634-5304	12	Bruce M. Achauer
	Sacramento	U. of Cal. Davis Med. Ctr.	916/453-3636	8	Robert Demling
	San Bernardino	San Bernardino Community	714/887-7047 ext. 405 or 444	6*	David Hess
		San Bernardino Co. Med. Ctr.	714/383-3131	9	Appannagari Gnanavez

State	City	Hospital	Telephone Number for Patient Referral	Special Burn Beds	Burns Service Medical Director or M.D.s Most Active in Burn Treatment
	San Diego	Univ. Hosp. U. of Cal. Medical Center	619/294-6502	14	Thomas Wachtel Hugh Frank
	San Francisco	St. Francis Mem. Hospital	415/775-4321	10	Edward Falces
		San Francisco Gen. Hosp.	415/821-8197	6	Juris Bunkis Anthony A. Meyer
	San Jose	Santa Clara Valley Med. Ctr.	408/279-5452	6	Ronald M. Sato
	San Pablo	Brookside Hospital	415/235-7000	6	Robert L. Shapiro
	Sherman Oaks	Sherman Oaks Comm. Hosp.	213/981-7111	30	A. Richard Grossman
	Stockton	Dameron Hospital	209/944-5550	7	Genest de L'Arbre
	Torrance	Torrance Memorial Hospital	213/325-9110	10	William D. Davies
	West Covina	Queen of the Valley Hosp.	213/960-6548	6	William T. Choctaw
Colorado	Colorado Springs	Penrose Hospital	303/630-5770	8	Ian G. Walker Claude Poliakoff
	Denver	Children's Hospital	303/861-6517	8	William Carl Bailey
		University Med. Center	303/394-8052	5	John Hansbrough
	Grand Junction	St. Mary's Hospital	303/242-9127	2*	William Merkel
	Greeley	N. Colorado Med. Ctr.	303/352-4121	4*	James R. Wheeler
	Pueblo	St. Mary-Corwin Hospital	303/560-4000	4*	Clifford Hoyle
Connecticut	Bridgeport	Bridgeport Hospital	203/384-3000	12	Michael L. D'Aiuto
	Hartford	Hartford Hospital	203/524-2840	5*	Philip E. Trowbridge et al
	New Haven	Yale-New Haven Hospital	203/785-2574	4*	Stephen Ariyan Charles Cuono
District of Columbia	Washington	Children's Hosp. National Medical Center	202/745-5116 202/745-5152	12	Judson G. Randolph
		Washington Hosp. Center	202/541-7241 or 202/541-6662	23	Marion Jordan
Florida	Gainesville	Shands Teaching Hospital	904/392-3055 or 904/392-3054	6	Hal G. Bingham
	Miami	Jackson Memorial Hospital	305/325-7085	8	C. Gillon Ward
	Orlando	Orlando Reg. Med. Ctr.	305/841-5176	5*	Patricio Quijada
	Tampa	Tampa General Hospital	813/253-0711 or 813/251-7617	17	C. Wayne Cruse

Georgia	Atlanta	Grady Mem. Hospital	404/588-4307	30	Roger Sherman
	Augusta	Doctor's Hospital	404/863-3232	10	Alton Garrison Joseph Still
		Eugene Talmadge Mem. Hosp. Med. Coll. of Georgia	404/828-3893	6	Richard C. Treat
	Columbus	Medical Center	404/571-1336	6*	Robert K. Worman
Hawaii	Honolulu	Straub Clinic and Hospital	808/523-2311	3*	James H. Penoff
Illinois	Chicago	Children's Memorial Hosp.	312/880-4094	6	Desmond Kernahan Victor Lewis
		Cook County Hospital	312/633-6564 312/633-6570	30	Takayoshi Matsuda Marella Hanumadass
		Edgewater Hospital	312/878-6000	4*	Ramesh Kharwadkar
		U. of Chicago Hospital	312/962-6212	20	Martin Robson
	Evanston	Evanston Hospital	312/492-7720	8	Charles Drueck
	Maywood	Foster G. McGaw Hospital, Loyola U. of Chicago	312/531-3988	14	Raymond Warpeha
	Rock Island	R.I. Franciscan Hospital	309/793-3173	13	Frank E. Miller
	Rockford	St. Anthony's Hospital	815/226-2000	8	Raymond Hoffman
	Springfield	Memorial Medical Center	217/788-3325	10	Elof Erickson
Indiana	Fort Wayne	St. Joseph's Hospital	219/425-3431	7	Jack Patterson
	Indianapolis	J. W. Riley Hospital	317/264-3927	8	A. Michael Sadove (children)
		W. N. Wishard Mem. Hosp.	317/630-6471	8	David J. Smith (adults)
Iowa	Iowa City	U. of Iowa Hosp. & Clinics	319/356-2496	13	Albert E. Cram
	Sioux City	St. Luke's Medical Center	712/279-3440	8	Larry D. Foster
Kansas	Kansas City	U. of Kansas Med. Ctr.	913/588-6540	10	Mani M. Mani David W. Robinson
	Wichita	St. Francis Hospital	316/268-5388	11	Tommy E. Kendall et al
		Wesley Medical Center	316/688-2688	2*	Richard C. Shaw et al
Kentucky	Lexington	University Hospital	606/233-5260	4	Edward Luce
	Louisville	Norton-Child's Hospital (admits adult burns)	502/589-8000	20	Harry D. Stambaugh et al

State	City	Hospital	Telephone Number for Patient Referral	Special Burn Beds	Burns Service Medical Director or M.D.s Mcst Active in Burn Treatment
Louisiana	Baton Rouge	Baton Rouge Gen. Hospital	504/387-7716	14	D. V. Cacioppo
	Marrero	West Jefferson Hospital	504/347-5511	14	Frank C. DiVincenti
	New Orleans	Charity Hospital of Louisiana	504/568-2311	4	Frank C. DiVincenti
	Shreveport	L.S.U. Med. Ctr. Hospital	318/674-6133	12	Edwin Deitch
Maine	Bangor	Eastern Maine Med. Ctr.	207/947-3711	*	Charles Dixon
	Portland	Maine Medical Center	207/871-2991	4	Joel Johnson, Act. Dir.
	Presque Isle	Aroostook Med. Ctr.	207/769-2511	*	Raymond Giberson
Maryland	Baltimore	Baltimore City Hospital	301/396-8765	21	Andrew Munster
Massachusetts	Boston	Beth Israel Hospital	617/735-2000	3*	Joel Noe
		Boston City Hospital	617/424-5204	2*	Irwin Hirsch
		Brigham & Women's Hospital	617/732-7712	10	Douglas W. Wilmore
		Mass. General Hospital	617/726-3354	10	John F. Burke
		Shriners Burns Institute	617/722-3000	30	John P. Remensnyder
	Springfield	Baystate Medical Center	413/787-4380	4*	Manu H. Desai
Michigan	Ann Arbor	Michigan Burn Center University Hospital Chelsea Comm. Hosp.	313/995-BURN	29	Irving Feller Jai K. Prasad
	Detroit	Children's Hosp. of Mich.	313/494-5678	12	James Lloyd
		Detroit Receiving Hospital	313/494-3374	18	Eti Gursel
	Flint	Hurley Medical Center	313/766-0188 or 313/766-0594	13	Franklin Wade
	Grand Rapids	Blodgett Mem. Med. Ctr.	616/774-7670	8	William Simpson Richard A. Wehrenberg
	Kalamazoo	Bronson Methodist Hosp.	616/383-6485 or 1-800/632-3403	12	Frank J. Newman Paul Fierke Michael Nave
	Lansing	Edward R. Sparrow Hosp.	517/487-2774	6	Errikos Constant Jorge Gomez
	Marquette	Marquette Gen. Hosp.	906/228-9440	*	James Keplinger Constance N. Arnold
	Saginaw	St. Mary's Hospital	517/790-5055	6	Syed Akhtar

Minnesota	Duluth	Miller Dawn Hosp. & Med. Ctr.	218/727-8762	12	John W. Wolf
	Minneapolis	Minneapolis Children's Health Ctr. & Hosp.	612/871-4551	4*	F. A. McParland
		Hennepin Co. Med. Ctr.	612/347-2915	8	John Twomey
		North Mem. Med. Ctr.	612/520-5200	6*	Brian Hubble
	Rochester	St. Mary's Hospital	507/285-5123 or 507/285-6691	6	George B. Irons (adults) Robert Telander (children)
	St. Paul	St. Paul-Ramsey Med. Ctr.	612/221-3351	24	Lynn D. Solem
Mississippi	Greenville	Delta Medical Center	601/378-3783	16	Robert Love
	Jackson	University Hospital	601/987-3916 or 601/987-5566	4	Frederick R. Heckler
Missouri	Columbia	U. of Mo. Health Sciences Center	314/882-7994	7	Boyd E. Terry
	Kansas City	Children's Mercy Hosp.	816/234-3520	6	Ronald J. Sharp
	St. Louis	Barnes Hospital	314/454-3244	6	William H. Monafo
		St. John's Mercy Med. Ctr.	314/569-6055	17	Vatche H. Ayvazian Dan F. Kopen
	Springfield	St. John's Regional Health Ctr.	417/885-2876	9	Mark Wittmer
Montana	Billings	Saint Vincent Hospital	406/245-2458	*	David F. Sloan
Nebraska	Lincoln	St. Elizabeth Comm. Health Ctr.	402/489-7181 or 402/483-9206	10	Robert W. Gillespie
Nevada	Las Vegas	Southern Nevada Mem. Hosp.	702/383-2268	12	Charles A. Buerk
New Jersey	Hackensack	Hackensack Hospital	201/441-2020	9*	Anthony Barbara
	Livingston	St. Barnabas Med. Ctr.	201/533-5920	12	Frederick Fuller Esber Mansour
New Mexico	Albuquerque	U. of New Mexico Hospital	505/843-2111	10	William R. Schiller
New York	Albany	Albany Medical Center	518/445-3010	9*	Dhiraj M. Shah
	Buffalo	Children's Hospital	716/878-7301, 7435	*	Theodore Jewett Donald R. Cooney Melvyn P. Karp
		Millard Fillmore Hospital	716/887-4776, 4649	4	Evan J. Evans
		Sheehan Mem. Emerg. Hosp.	716/842-2200	10	Louis C. Cloutier
	East Meadow	Nassau County Med. Ctr.	516/542-3207	18	Roger L. Simpson
	Elmira	St. Joseph's Hospital	607/733-6541	4	James Marshall James Sonsire

State	City	Hospital	Telephone Number for Patient Referral	Special Burn Beds	Burns Service Medical Director or M.D.s Most Active in Burn Treatment
	New York City:				
	Bronx	Bronx Municipal Hosp. Ctr.	212/430-8065	11	Stanley Levenson
	Brooklyn	Kings County Hospital	212/735-3131	5	Winston Mitchell
	Manhattan	Harlem Hospital Ctr.	212/694-1335	5	James E. C. Norris
		NY Hosp.-Cornell Med. Ctr.	212/472-5132	24	Cleon Goodwin
		St. Vincent's Hospital	212/790-8940, 8941	6	Ronald N. Ollstein
	Rochester	Strong Memorial Hosp.	716/275-5475	9	Robert M. McCormack
	Syracuse	Upstate Medical Center	315/473-6083	6	William Clark
	Valhalla	Westchester Co. Med. Ctr.	914/347-4909	10	Roger E. Salisbury
	West Islip	Good Samaritan Hospital	516/957-4000	*	Richard A. Giery
North Carolina	Chapel Hill	N. Carolina Mem. Hospital	919/966-4131	23	Hugh P. Peterson
	Charlotte	Charlotte Mem. Med. Ctr.	704/331-2525	4	Harold Hamit
	Durham	Duke University Hospital	919/681-2404	9	Gregory Georgiade Joseph Moylan
	Winston-Salem	N.C. Baptist Hospital	919/748-7766	6	Jesse H. Meredith Connell Shearin
North Dakota	Fargo	St. Luke's Gen. Hospital	701/280-5504	4	David W. Todd
Ohio	Akron	Children's Hosp. Med. Ctr. (admits adult burns)	216/379-8224	12	C.R. Boeckmann R.L. Klein
	Cincinnati	U. of Cincinnati Hosp.	513/872-3100	10	Robert P. Hummel
		Shriners Burns Institute	513/751-3900	30	Bruce G. MacMillan
	Cleveland	Cleveland Metro. Gen. Hosp.	216/459-5627	16	Richard Fratianne
	Columbus	Children's Hospital	614/461-2000	14	E. Thomas Boles
		Ohio State Univ. Hospital	614/422-4516	6	Robert Ruberg
	Dayton	Children's Med. Ctr.	513/226-8300	6	Charles D. Goodwin
		Miami Valley Hospital	513/223-6192	4*	R.K. Finley Sidney Miller
	Toledo	St. Vincent's Hospital	419/259-4734	12	George Baibak Michael Yanik
Oklahoma	Oklahoma City	Baptist Medical Center	405/949-3345	15	Paul Silverstein
		Oklahoma Children's Mem. H.	405/271-4733	12	William P. Tunell
	Tulsa	Hillcrest Medical Center	918/584-1351	28	Bernard Swartz

Oregon	Portland	Oregon Burn Center (at Emanuel Hospital)	503/280-4233	12	Philip Parshley
Pennsylvania	Allentown	Lehigh Valley Hospital Center	215/821-2058	6	Walter J. Okunski
	Chester	Crozer-Chester Med. Ctr.	215/876-0356	19	Charles E. Hartford
	Danville	Geisinger Medical Center	717/271-6353 or 717/271-6591	4	Philip C. Breen
	Erie	Hamot Medical Center	814/459-0344	8	Charles R. Bales Forrest C. Mischler
	Hershey	Hershey Medical Center	717/534-8521	*	William P. Graham
	Philadelphia	Saint Agnes Medical Ctr.	215/339-4339	11	Frederick A. DeClement
		St. Christopher's Hosp. for Children	215/427-5000	4	Stuart J. Hulnick
	Pittsburgh	Mercy Hospital	412/232-8225	7	Thomas Layton
		Western Pa. Hospital	412/578-5273	18	John Gaisford
	York	York Hospital	717/771-2345	6*	Robert Davis Richard W. Dabb
Rhode Island	Providence	Rhode Island Hospital	401/277-4000	4*	Lawrence Bowen
South Carolina	Charleston	Medical Univ. Hospital	803/792-3681 803/792-3851	12	Dabney R. Yarbrough (adult) H. Biemann Othersen Jr. (ch.)
Tennessee	Chattanooga	Baroness Erlanger Hosp.	615/778-7881	6	Phil D. Craft
	Memphis	City of Memphis Hospital	901/528-7100	*	William Hickerson Gary Reynolds
	Nashville	Vanderbilt U. Hospital	615/322-7311	10	John B. Lynch
Texas	Austin	Brackenridge Hospital	512/476-6461	*	Robert A. Ersek et al
	Beaumont	Baptist Hospital	713/835-3781	10	Duane Larson Wesley Washburn
	Corpus Christi	Memorial Medical Center	512/881-4360	9	Robert H. Balme
	Dallas	Parkland Memorial Hospital	214/638-8546 or 214/688-2152	30	John Hunt
	El Paso	Sun Towers Hospital	915/532-6281	12	Charles Lyon et al
	Fort Sam Houston	Brooke Army Medical Ctr.	512/221-4604 or 2943	40	Basil A. Pruitt, Jr.
	Fort Worth	John Peter Smith Hospital	817/921-3431	*	Charles Crenshaw et al
	Galveston	University of Texas Medical Branch Hospitals	713/761-1255	16	Sally Abston
		Shriners Burns Institute	713/765-2516	30	David N. Herndon

State	City	Hospital	Telephone Number for Patient Referral	Special Burn Beds	Burns Service Medical Director or M.D.s Most Active in Burn Treatment
	Houston	Ben Taub Gen. Hospital	713/791-7000	8	Frank Gerow
		Hermann Hospital	713/792-5406	12	David E. Beesinger
	Lubbock	Lubbock Gen. Hosp.	806/743-3406	6	Richard Baker Timothy Harnar
	San Antonio	Medical Center Hospital	512/696-3030 or 512/691-6151	*	A.B. Cruz, Jr.
Utah	Salt Lake City	U. of Utah Hospital	801/581-2700	12	Glenn Warden Jeffrey Saffle
Vermont	Burlington	Med. Ctr. Hosp. of Vermont	802/656-4545	6*	John Davis Richard Gamelli
Virginia	Charlottesville	U. of Virginia Med. Ctr.	804/924-5520	6	Richard Edlich
	Norfolk	Norfolk Gen. Hospital	804/628-3117	8	William Bethea
	Richmond	Med. Coll. of Virginia Hosp.	804/786-9240	12	Boyd W. Haynes
Washington	Bellingham	St. Joseph's Hospital	206/734-5400, ext. 2501	2*	James Hines
	Seattle	Children's Orthopedic Hosp.	206/634-5283	8	Robert T. Schaller, Jr.
		Harborview Med. Ctr.	206/223-3127	40	David Heimbach
	Spokane	Sacred Heart Med. Ctr.	509/455-3344	4*	Charles Miller
	Tacoma	St. Joseph's Hospital	206/627-4101 or 206/591-6677	10	Martin Schaeferle
West Virginia	Huntington	Cabell-Huntington Hospital	304/696-6110	4	James A. Coil, Jr.
Wisconsin	Madison	U. of Wisconsin Hosps.	608/263-1490 or 608/263-1387	7	Richard Helgerson
	Milwaukee	St. Mary's Hospital	414/225-8000	20	George Collentine

Fire Protection Consultants

The following list of fire protection consultants is arranged by state and specialty. If your firm is not listed here and would like to be included on this list in the 1985 FIRE ALMANAC, please send the name, address, phone number, and any specialties of your firm to: Editor, *Fire Almanac*, Batterymarch Park, Quincy, MA 02269.

Alabama

Michael Haynes
Rt. 4, Box 206
Talladega 35160
(205) 354-7079

California

John F. Behrens, FPE, Code Consultant
7222 Deep Harbor Dr.
Huntington Beach 92648
(714) 960-1538

Life Safety Code; Uniform Building Code; Model Building Codes

Bergstrom Consulting Engineers, Inc.
680 Warren St.
Redwood City 94063
(415) 368-3277

Fire protection consultants and design

Haden B. Brumbeloe and Associates and Fire Protection Contractor
Mail: P.O. Box 606
Danville 94526
Shipping: 1850 Lacassie, Suite 5
Walnut Creek 94596
(415) 939-7271

Fire protection piping systems; litigation-expert witness, management consultant to sprinkler contractors

William E. Busby, Consulting Engineer
Keystone Building
Mill Valley 94941
(415) 388-6321

Fire origin and cause investigations

The Code Consortium
Fire Protection Engineers
Rick Thornberry, PE
611 Cabot Way
Napa 94559
(707) 253-2633

Fire protection engineering and consultation for fire and building codes, sprinkler system design, and code representation.

John G. Degenkolb
1720 Chevy Knoll Dr.
Glendale 91206
(213) 245-3075

Fire Protection Engineer/Code Consultant

Harry S. Dixon, PhD — Engineers
130 Jessie St.
San Francisco 94105
(415) 495-3406

Fire cause determination by investigation and/or tests and analysis

The FPE Group
649 Mission St.
San Francisco 94105
(415) 495-3310

Worldwide consulting engineering services in hazard analysis, risk management, safety management, system design, boiler's machinery loss control

Gage-Babcock and Associates, Inc.
5525 E. Seventh St.
Long Beach 90804
(213) 597-0303

Consulting and engineering services in fire protection, security and safety

Gage-Babcock and Associates, Inc.
1440 Broadway, Suite #308
Oakland 94612
(415) 465-2557

Consulting and engineering services in fire protection, security and safety

James R. Gaskill, PE
875 Estates St.
Livermore 94550
(415) 447-3417

Smoke hazards; smoke damage fire terminology — chemical engineering

James E. Hill, PE FPE
3601 Via La Selva
Palos Verdes Estates 90274
(213) 375-2689

Flammable liquids; LP Gas; Gas

Rolf Jensen and Associates, Inc.
620 Contra Costa Blvd., Suite 209
Pleasant Hill 94523
(415) 680-0350

Code consulting; system design; industrial survey; municipal

Schirmer Engineering Corporation
357 Civic Dr., Suite 6
Pleasant Hill 94523
(415) 827-5858

Code consultation; suppression system design; fire and security; design; loss control engineering

Max R. Schulman
Schulman Associates Ltd.
8571 Harrison Way
Buena Park 90620
(714) 995-5867

Government installations

Sierra Consultants International
649 Mission St.
San Francisco 94105
(415) 777-3855
Telex: 181159 (LSA)

Fire and explosion engineering and technology

Colorado

Aspen Engineering, Inc.
P.O. Box 4338
Woodland Park 80863
(303) 687-3487

Fire protection engineering and code consulting

Diliberto and Associates
1133 Race St., 75
P.O. Drawer F
Denver 80218
(303) 321-7439

Fire protection and safety engineering consulting

Fire Measure Inc.
Cliff Harvey
1090 Edinboro Drive
Boulder 80303

Fire protection and prevention consulting, including property inspections, investigation and determination of fire cause, computer programs for fire problem evaluation and incident reporting

Hauser Laboratories
5680 Central Ave.
P.O. Box G
Boulder 80306
(303) 443-4662

Investigation for fire origin and cause; facilities for assessing fire remains for possible arson; and evaluating equipment, systems or materials for malfunction or contribution to fire cause

Connecticut

William J. Bradford, PE
22 Deer Run Road
Brookfield 06804

William H. Doyle
36 Massacoe St.
Simsbury 06070
(203) 658-5198

Chemical plant explosions and fires; investigation and prevention

Alan Lipschultz, MS PE
Waterbury Hospital
64 Robbins St.
Waterbury 06721
(203) 573-7194

Clinical engineering; electrical safety in hospitals

Washington, DC

Howard M. Markman
1201 Connecticut Ave., NW
Washington 20036
(202) 775-8012

Attorney-At-Law/Fire Protection Consultant

Florida

William Alvine Associates, Inc.
P.O. Box 340041
Boca Raton 33434
(305) 487-2782
and
31 Cypress Way
Casselberry 32707
(305) 339-3473

Fire and explosion analysis; forensic science laboratory; engineering services

Gage-Babcock and Associates, Inc.
10021 SW 133rd St.
Miami 33176
(305) 235-4696

Consulting and engineering services in fire protection, security and safety

Alfred J. Hogan, PE
Fire Protection Engineer/Code Consultant
P.O. Box 30
Cypress Gardens 33880
(813) 324-4893

Fire protection engineering including fire investigation and code consulting

Knight & Associates, International
W.J. "Tommy" Knight
"Mysterious Waters"
Rt. 3, Box 343
Crawfordville 32327
(904) 926-7073

Full-service private investigative agency; fire and arson investigations, fire safety codes and standards

Rimbey, Howell and Rimbey, Inc.
Consulting Engineers
10730 N. 56th St.
P.O. Box 16189
Tampa 33687
(813) 988-1821

Fire and explosion investigations; reconstruction; arson determination; causation

Idaho

William W. Miller, Fire Protection Consultants
P.O. Box 691
Sun Valley 83353
(208) 788-4103

Fire protection planning; architectural code specialist; development site planning; systems design; municipal master planning for fire protection

Illinois

A. Lynn Anderson and Associates
Heritage Office Building
800 N. Main
Antioch 60002
(312) 395-7456

Fire retardant chemicals; fire retardant thermoplastics

Sami Atallah
907 W. Ainslie
Chicago 60640
(312) 334-2025

Camplin, Bartels, Erickson and Associates, Inc.
P.O. Box 7159
Chicago 60680
(312) 951-5686

Healthcare life safety and loss control

Gage-Babcock and Associates, Inc.
135 Addison Ave.
Elmhurst 60126
(312) 530-1494

Consulting and engineering services in fire protection, security and safety

I.P.C.
4309 West Henderson
Chicago 60641
(312) 975-3388

Auditing existing fire safety programs in hotel/motel properties, health care facilities; evacuation planning and fire response team training

Rolf Jensen and Associates, Inc.
104 Wilmot Rd., Suite 201
Deerfield 60015
(312) 948-0700

Fire protection engineering; building code consulting; equivalency analysis; detection—alarm—extinguishing system design

John A. Kennedy and Associates, Inc.
53 W. Jackson Blvd.
Chicago 60604
(312) 939-6050

Fire and explosion cause and origin investigations; forensic laboratory services; forensic engineering; electrical engineering investigations

M&M Protection Consultants
Marsh and McLennan Plaza
222 S. Riverside
Chicago 60606
(312) 648-6821

Industrial fire protection; business interruption interdependency analysis; emergency planning; auditing of fire protection management

John M. Mertens, PE CSP
Fire Protection Consultant
1407 Dorothy Drive
Palatine 60067
(312) 991-1914

Fire and explosion investigation; fire hazard analyses; fire suppression system design; building codes and standards consulting; training programs (Professor in Fire Protection Engineering); fire testing

NATLSCO (National Loss Control Service Corp.)
Kemper Center
Long Grove 60049
(312) 540-3465

Fire protection engineering; industrial and municipal

James W. Nolan Company
999 E. Touhy Ave.
Des Plaines 60018-2787
(312) 299-4020

Fire protection water supply, i.e., standpipe design and fire pump specialists

Polytechnic, Inc.
3740 Morse Ave.
Chicago 60645
(312) 677-0450

Combustion, fire and explosion investigations

Schirmer Engineering Corporation
707 Lake Cook Rd.
Deerfield 60015
(312) 272-8340

Code consultation; suppression system design; fire and security design; loss control engineering

Richard H. Solomon, PE
Fire Protection Engineering
356 S. Loomis St.
Naperville 60540
(312) 355-6606

Public fire suppression systems; building/fire prevention codes analysis; land planning and use—fire prevention

3M Engineering Analyst Ltd.
Henry S. Morton, Cdr., USN (Ret.)
118-1/2 N. 4th Ave.
St. Charles 60174
(312) 583-3034

Registered engineer specializing in cause of loss pertaining to explosion, fire, combustion dynamics, and marine and mechanical engineering

Lansing B. Warner, Inc.
4300 Peterson Ave.
Chicago 60646
(312) 736-1400

Insurers and insurance consultants to the food industry

Fred J. Zeleny
800 N. Delphia
Park Ridge 60068
(312) 823-6907

Consultant on general fire protection, electrical equipment in extra hazardous locations and nuclear power plants

Iowa

Diedrichs and Associates
2804 Walnut St.
Cedar Falls 50613
(319) 266-6257

Electrical and mechanical engineering; consulting; design and testing

Doerfer Division
201 Washington St.
Cedar Falls 50613
(319) 277-3110

General engineering design

Louisiana

Thompson Consultant
1510 Kabel Dr.
New Orleans 70114
(504) 392-1227

Maryland

Benjamin/Clarke Associates, Inc.
10605 Concord St., Suite 501
Kensington 20895
(301) 949-1414

Fire risk analysis, including nonroutine testing and combustion product toxicity; mathematical fire modeling and development of equivalency systems

DuLac Associates
5811 Park Dr.
So. Bowie 20716
(301) 262-6345

Municipal fire service management

Forensic Technologies International
(formerly CADCOM Forensic Engineering Directorate)
107 Ridgely Ave.
Annapolis 21401
(301) 268-1100

Fires; explosion; cause determination; fire protection systems

Hanna Engineering Corp.
Hampton House, Suite 702
204 E. Joppa Rd.
Baltimore 21204-3048
(301) 321-8824

Life safety and fire protection consulting

Hughes Associates, Inc.
10605 Concord St., Suite 501
Kensington 20895
(301) 949-0505

Fire protection engineering

Marshal A. Klein and Associates, Inc.
6815 Autumn View Dr.
Eldersburg 21784
(301) 781-6474

Fire Protection Engineers/Building Code Consultants

Klinker and Associates
Richard L. Klinker, PE
2355 Davidsonville Road
Gambrills 21054
(301) 261-0898

Morris and Ward
Box 30237
Bethesda 20814
(301) 320-4900

Safe egress; fire protection building security

Rothfuss Engineering Corp.
P.O. Box 97
Columbia 21044
Columbia (301) 997-7437
DC (301) 621-5599

Fire protection services; facilities protection (buildings, ships); investigations (fire/arson, equipment/system failure analysis)

Systems Technology, Inc.
32 Castle Ct.
Gaithersburg 20878
(301) 948-7354

Fire protection; engineering management; expert witness services

Joseph K. Taussig, Jr.
400 Ridgely Ave.
Annapolis 21401
(301) 268-3654

Specifying and leading clients to the attainment of actual commercially available, state-of-the-art materials capable of withstanding at least 1200 C

Massachusetts

Phillip Blye
64 Turnpike St.
So. Easton 02375
(617) 238-2468

Educational consultant; fire research and design seminars on fire safety

Horatio Bond
Consulting Engineer
Hyannis Port 02647
(617) 771-1606
775-1647

G.F. Charette and Associates, Inc.
279 Cambridge St.
Burlington 01803
(617) 273-1320
273-1321
273-4288

Electrical; electrical forensic investigation; fire investigation (arson/accidental)

Harold R. Cutler
Consulting Fire Protection Engineer
165 Landham Road
Sudbury 01776

Demers Associates, Inc.
42 Highland St.
Lunenburg 01462
(617) 582-4816

Fire protection engineering; fire investigations

Firepro, Inc.
P.O. Box 145
Wellesley Hills 02181

Fire protection engineering; building firesafety; code consulting; fire and explosion analysis; municipal fire studies

Investigating Consultants on Fire and Arson
Chief Norman F. Clough, Ret.
11 Echo St.
Malden 02148

Investigating fires and consulting on related subjects

K-Chem Laboratories
46 Clayton St.
Boston 02122
(617) 436-7181

Arson sample analysis; fire scene examination; loss analysis; fire research and reconstruction; product testing

Mechanical Designs Limited
Fire Protection Systems Designers
P.O. Box 700
Natick 01760
(617) 653-5452

Preparation of automatic sprinkler drawings for bid and installation purposes

Timothy J. O'Leary Contract Construction Consultants Co.
97 Chapel St.
Needham 02192
(617) 444-3754

HVAC, construction bond claim specialist, construction investigative services

Phoenix Technology Group, Inc.
22 Washington St.
Norwell 02061
(617) 878-0567

Consultants on building code matters

Skinner and Sherman Laboratories, Inc.
300 Second Ave.
Waltham 02154
(617) 890-7200

Fire investigations; failure analysis (chemical, mechanical, metallurgical, civil, electrical, electronic)

Sullivan Associates Engineering Consultants
9 Matthews St.
Andover 01810
(617) 685-7555

Product liability and fire causation analysts

Technical Management Services
13 Eastgate Lane
Hingham 02043
(617) 749-3010

Butane cigarette lighter safety

Michigan

John J. Ahern
3485 Bradway Blvd.
Birmingham 48010
(313) 646-7929

Fire explosion and security

Mississippi

A.K. Rosenhan Consulting Engineers, Ltd.
Drawer KJ
Mississippi State 39762
(601) 325-3865

General fire protection engineering; fire investigation; computer applications of fire protection engineering

Missouri

Code Consultants Inc.
1023 Executive Parkway Dr.
St. Louis 63141
(314) 576-1850

Fire protection consulting and design

Nevada

Anti Fire
Patrick E. Phillips, P.E.
Phillips and Associates
1963 Sycamore Trail
Las Vegas 89108
(702) 648-6757

Fire protection for nuclear, industrial, commercial, inspection, review, design, specification of structures, protection and suppression systems

New Jersey

William Alvine Associates Inc.
12 Commerce Rd.
Fairfield 07006
(201) 227-5340

Fire and explosion analysts; forensic science laboratory; engineering services

The FPE Group
1904 Bromley Estates
Pine Hill 08021
(609) 784-7618

Fire protection engineering—industrial, government, military-defense

Safety Engineering Consultants
65 Lake Shore Rd.
Lake Hopatcong 07849
(201) 663-0567

Life safety applications; flammable liquids; loss investigation; combustible dusts

A. Wallach Industrial Technical
Associates
3 Stanley Rd.
P.O. Box 332
West Orange 07052

Determining causes of fire; fire prevention procedures

New Mexico

D-CO-INC.
P.O. Box 5362
1210 Luisa St., Suite 11
Santa Fe 87502
(505) 983-1594

Consultants specializing in early warning fire detection and Halon 1301 fire protection systems; inspections, code compliance, design, application, reports and troubleshooting of existing system problems

New York

American Standards Testing Bureau, Inc.
40 Water St.
New York 10004
Offices and laboratories nationwide and overseas
(212) 943-3160
(800) 221-5170

Complete engineering consulting and laboratory services; code and procedures development; protection systems, materials flammability and equipment evaluation; safety; risk analysis and fire loss studies

Elliott R. Berrin, PE PC
P.O. Box 255
Freeport 11520
(516) 379-7706

Fire investigation and fire protection engineering

Martin M. Brown, PE CSP
40 Midchester Ave.
White Plains 10606
(914) 949-5017

Fire and explosion investigations; code interpretations

Connell Consultants, Ltd.
185 Great Neck Rd.
Great Neck 11021
(212) 229-4500

Fire investigation; marine fire analysis

Eugene E. Drucker Associates, Inc.
228 Lockwood Rd.
Syracuse 13214
(315) 446-6864 or
423-4369

Fire and arson investigation, cause and origin determination; explosions

Gage-Babcock and Associates, Inc.
105 Kisco Ave.
Mt. Kisco 10549
(914) 666-2981

Consulting and engineering services in fire protection, security and safety

The Govmark Organization, Inc.
P.O. Box 807
Bellmore 11710
(516) 293-8944

Flammability testing of textiles and plastics; expert witness; manufacturer of flammability test equipment

Hartheimer, Bender and Estey Architects and Engineers
1 Becker Terrace
Delmar 12054
(518) 439-7666

Firesafety

Edwin C. Kirchmeier
72-17 Myrtle Ave.
Glendale 11385
(212) 821-3786

Industrial safety; Life Safety Code; flammable liquids

Frank J. Simon, PE
59 Bowbell Rd.
White Plains 10607
(914) 761-6214

Fire protection systems in health care institutions

North Carolina

McNeary Insurance Consulting Services, Inc.
Suite 301, 6525 Morrison Blvd.
P.O. Box 220926
Charlotte 28222

Fire protection engineering—codes and standards consulting, design of systems, and inspections, investigations and reports for loss control or adjustment

Research Engineers, Inc.
P.O. Box 12072
Research Triangle Park 27709

Fire and arson investigations; fire protection; product liability

Ohio

Frederick Rauh and Company
3300 Central Parkway
Cincinnati 45225
(513) 559-0500

Fire sprinkler protection; property and casualty inspections; evaluations and reports; NFPA codes; FM standards and OSHA (excl health)

L.E. Shingledecker
Safety Consultant
1778 S. Fountain Ave.
Springfield 45506
(513) 322-6302

Development and installation of fire-safety programs with employees and/or supervisors

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Joe W. Daugherty and Associates, Inc.
1720 S. Memorial Dr.
Tulsa 74112
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Consulting, design and specifications for all phases of fire protection

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John W. Anderson, PE, PhD
Chemical and Engineering Consultant
P.O. Box 387
Neskowin 97149
(503) 392-3622

Fire/explosion investigations; arson investigation; expert witness; flammability

Melott and Associates
11650 SW BelAire Ln.
Beaverton 97005
(503) 643-5608

Fire protection consulting; fire protection engineering

Pennsylvania

David Brown Associates
P.O. Box 581
Boyertown 19512
(215) 367-6225
Telex 84-6322

Industrial safety systems; fire and explosion suppression systems, oil and gas industry

Fire Analysis Service
4018 Indian Guide Rd.
Lafayette Hill 19444
(215) 828-2909

Loss risk inspections; fire prevention consultant; fire protection consultant; fire cause investigations; health-care in-service training; business and industrial training

Firecon
R. Craig Schroll, Chief Consultant
29 Knollwood Dr.
Lancaster 17601
(717) 291-2139

Training and education; fire brigade organization and evaluation; hazard control and analysis; industrial fire protection; flammable liquids; emergency planning

Fire Protection Engineering Associates
1710 Stoke Park Rd.
Bethlehem 18017
(215) 865-3054

Rhode Island

Walsh Engineering, Inc., Professional Fire Protection Engineers
7 Belver Ave.
Quonset Point Industrial Park
P.O. Box 141
North Kingston 02852
(401) 295-8600

Computer programs for sprinkler system hydraulics; computerized sprinkler system hydraulic calculations; analysis of sprinkler system capabilities; re-design of existing sprinkler systems

South Carolina

Joseph E. Johnson, Fire Protection Consultant
1 Saltwind Way
Hilton Head Island 29928
(803) 681-5185

Detection and extinguishing systems and general fire protection engineering

Tennessee

Donald W. Belles
Fire Protection Consultant
101 Cumberland Ave., Suite 200
Madison 37115
(615) 868-8877

Application of fire and building codes

Fire Protection Associates, Inc.
1101 Kermit Dr., Suite 304
Nashville 37217
(615) 361-4700

Life safety and code consulting, building evaluations, and fire investigations

John A. Preston Associates
1708 Parkway Towers
Nashville 37219
(615) 255-8711

Architecture; building consultants; fire protection

Professional Loss Control, Inc.
P.O. Box 446
Oak Ridge 37830
(615) 482-3541

Fire protection engineering consultants—fire hazard analyses; design; training; research; inspections; audits

Texas

William E. Fitch, PE
P.O. Box 63039
Wetmore 78163
(512) 654-1771

Material product safety analysis, building codes, fire testing

Rolf Jensen and Associates, Inc.
7015 W. Tidwell Rd., Suite 101
Houston 77092
(713) 462-1840

Fire protection engineers and building code consultants

Wormald Fire Engineering Division
P.O. Box 73683
Houston 77273
(713) 537-0368

Fire protection

Vermont

Fire Safety Institute
P.O. Box 674
Middlebury 05753
(802) 462-2663

Risk analysis; information; education

Virginia

Carson Associates, Inc.
Box 286-B, Rt. 3
Warrenton 22186
(703) 347-7488

Fire protection engineers

James Reid Dowling and Associates, Inc.
Professional Consultants/Washington, DC
6405 Bardu Court
Springfield 22152
(703) 451-4307

Fire/life safety and building regulations

Gage-Babcock and Associates, Inc.
301 Maple Ave., W. Suite 2-F
Vienna 22180
(703) 938-9132

Consulting and engineering services in fire protection, security and safety

Interface Consultants, Inc.
P.O. Box 269
Norfolk 23501
(804) 623-4347

Accessibility and fire and life safety for the handicapped

Rolf Jensen and Associates, Inc.
5803 Rolling Rd., Suite 207
Springfield 22152
(703) 569-5666

Fire protection engineers and building code consultants

Schirmer Engineering Corporation
803 West Broad Street
Suite 104
Falls Church 22046
(703) 237-8211

Code consultation; suppression system design; fire and security design; loss control engineering

TriData Corporation
Philip S. Schaenman, President
1500 Wilson Boulevard
Arlington 22209
(703) 841-2975

Fire and safety data systems and analyses; computerized data systems; litigation-expert witness

Washington

Cedar Falls Corporation
208 Carlson Building
Bellevue 98004
(206) 454-2580

Fire and explosion investigation

McNerney, Hargett, Stephens and Associates
Northgate Executive Center
155 NE 100th, Suite 104
Seattle 98125
(206) 527-3000

Fire protection consulting and fire investigation

Wisconsin

Raymond C. Max and Associates
N84 W16033 Menomonee Ave.
Menomonee Falls 53051
(414) 255-4309

Fire protection systems design and loss investigations, inspections and reports

Canada

ADI Limited
P.O. Box 44
Fredericton, NB E3B 4Y2
(506) 454-4491

Fire protection for health care facilities

Compyro Consultants Ltd.
Suite 106
1099 W. 8th Ave.
Vancouver, BC V6H 1C3
(604) 732-3751

Fire protection engineers and building code consultants

Rolf Jensen and Associates, Ltd.
Suite 1308, 797 Don Mills Rd.
Don Mills, Ont. M3C 1V2
(416) 429-1638

Fire protection engineers and building code consultants

McCully and Associates
Loss Control Consultants, Inc.
1220-33 Banner Rd.
Ottawa, Ont. K2H 8V7
(613) 820-9644

Fire protection

M&M Protection Consultants
1 First Canadian Place, 54th Floor
P.O. Box 58
Toronto, Ont. M5X 1G2
(416) 868-2771

Industrial fire protection; business interruption interdependency analysis; emergency planning; audit of fire protection management

Professional Loss Control Ltd.
P.O. Box 755
Fredericton, NB E3B 5B4
(506) 455-5303

Fire protection engineering consultants - fire hazard analyses, design, training, research, inspections, audits

Philippines

M.P. Shih Safety Consultants
P.O. Box 899
Manila, Philippines
772-744

Fire protection consulting and design

Republic of China

M.P. Shih Safety Consultants
P.O. Box 69-72
Taipei, Taiwan
Republic of China
(02) 5613725
(02) 5612616

Fire protection consulting and design

CANADA

The following list of fire protection consultants is from the Canadian Automatic Sprinkler Association, 3638 Victoria Park Ave., Willowdale, Ontario M2H 3B2; (416) 497-2100.

Alberta

Automatic Sprinkler Limited
431 Manitou Road, S.E.
Calgary T2G 4C2
(403) 243-8210

Automatic Sprinkler Limited
11703—170 Street
Edmonton T5M 3W7
(403) 451-0280

Grinnell Fire Protection Systems
#14-4216—12 Street N.E.
Calgary T2E 6K9
(403) 276-9089

Grinnell Fire Protection Systems
141136—128 Avenue
Edmonton T5L 3H5
(403) 452-5280

Viking Sprinkler Co. Ltd.
3820-C Manchester Road S.E.
Calgary T2G 3Z9
(403) 287-2182

Viking Sprinkler Co. Ltd.
4306 81st Avenue
Edmonton T6B 2M2
(403) 465-9404

Vipond Automatic Sprinkler Co. Ltd.
Box 3320, Station D
Edmonton T5L 4J2
(403) 484-6641

Vipond Automatic Sprinkler Co. Ltd.
Building K, Unit 4
4-4429—6th Street North East
Calgary T2E 3Z6
(403) 230-1781

British Columbia

ACO Fire Protection
4837 Patrick Place
Burnaby V5j 3A5
(604) 420-3574

Argus Installation Ltd.
2625 Skeena Street
Vancouver V5M 3Y6
(604) 437-5531

Ashford Automatic Sprinkler
#103-2931 Olafson Avenue
Richmond V6X 2R4
(604) 270-1024

Automatic Sprinkler Ltd.
3210 Lake City Way
Burnaby V5A 3A4
(604) 420-3230

Canem Systems Limited
1355 Verdun Place
Richmond V6V 1W5
(604) 273-1131

Grinnell Fire Protection Systems Co. Ltd.
4027 Phillips Avenue
North Burnaby V5A 2X4
(604) 460-4636

Industrial Fire Protection
1910 Broadway
Coquitlam V3C 2N1
(604) 941-6207

Kal Sprinklers Limited
2328 Clarke Street
Port Moody V3H 1Y8
(604) 939-4416

Mawhinney Bros. Sprinklers Ltd.
1872 Kingsway
Vancouver V5N 2S7
(604) 872-7774

National Installations Ltd.
12178—86th Avenue
Surrey V3W 3H7
(604) 591-6371

Rigid Fire Protection Co. Ltd.
18628—76th Avenue
Surrey V3S 4P1
(604) 576-6865

Upper Valley Fire Protection Ltd.
219—Riverside Drive
Chilliwack V2P 3L2
(604) 792-1640

Viking Sprinkler Co. Ltd.
8290 Ross Street
Vancouver V5X 4C6
(604) 324-7122

Manitoba

Bodner Co. Ltd.
1808 Main Street
Winnipeg R2V 2A3
(204) 334-4317

Bodner Contracting Ltd.
1541 Dugald Road
Winnipeg R2j 0H3
(204) 224-3295

Grinnell Fire Protection Systems Co. Ltd.
984 Powell Avenue
Winnipeg R3H 0H6
(204) 633-9308

Reliable Fire Protection
1541 Dugald Road

Winnipeg R2S 0H3
(204) 222-1091

Vipond Automatic Sprinkler Co. Ltd.
571 Ferry Road
Winnipeg R3H 0T5
(204) 775-8411

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Barley Sprinkler (Sales) Limited
398 Dover Road
Fox Creek E0A 1R0
(506) 854-9224

Eastward Industries Limited
P.O. Box 282
Saint John E2L 3Y2
(506) 652-5560

Grannan Plumbing and Heating Limited
P.O. Box 625
Saint John E2L 4A5
(506) 652-4680

Viking Fire Protection Ltd.
997 Cameron Street
Moncton E1C 8L9
(506) 855-0439

Vipond Automatic Sprinkler Co. Ltd.
P.O. Box 888, 48 Rideout Street
Moncton E1C 8N8
(506) 389-3505

Newfoundland

Vipond Automatic Sprinkler Co. Ltd.
23 Sinnott Place, Kilbride
St. John's A1G 1L1
(709) 364-2898

Nova Scotia

Eastward Industries Limited
P.O. Box 2003, Dartmouth E
Dartmouth B2W 3X8
(902) 463-2776

Grinnell Fire Protection Systems Co. Ltd.
43 Fielding Avenue
Dartmouth E3R 1E3
(902) 469-8100

Scotia Sprinklers Ltd.
10 Akerly Blvd., Suite 31
Burnside Industrial Park
Dartmouth B3B 1J4

Vipond Automatic Sprinkler Co. Ltd.
75-Y Akerly Blvd.
Dartmouth B3B 1R7
(902) 469-3465

Ontario

Adam Clark Co. Ltd.
P.O. Box 40, Station E
Hamilton L8S 4L1
(416) 823-4660

Automatic Sprinkler Ltd.
97 Bessemer Road, Suite f
London N6E 1Pg
(800) 265-5449

Automatic Sprinkler Ltd.
1331 Blundell Road
Mississauga L4Y 1M6
(416) 270-1440

Babco Automatic Sprinklers and Fire Protection Ltd.
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Ottawa K1S 2H2
(613) 233-6485

Bennett and Wright (Eastern) Ltd.
47 Cranfield Road
Toronto M4B 3H7
(416) 751-5111

Chemetron Fire Systems
39 Enterprise Road
Rexdale M9W 1C4
(416) 243-1505

Clow Darling Plumbing and Heating Ltd.
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(807) 623-7485

Desco Fire Protection Ltd.
P.O. Box 107, R.R. #2, 4th Line
Navan K0A 2S0
(613) 824-7035

Duncan-Reynolds Ltd.
115 Howden Road
Scarborough M1r 3E3
(416) 751-6252

H.G. Francis and Sons Ltd.
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(613) 238-4700

Grinnell Fire Protection Systems Co. Ltd.
25 Groff Place, Unit 1
Kitchener N2E 2L6
(519) 893-5100

Grinnell Fire Protection Systems Co. Ltd.
2427 Holly Lane
Ottawa K1V 7P2
(613) 731-0761

Grinnell Fire Protection Systems Co. Ltd.
25 Worcester Drive
Rexdale M9W 1Kg
(416) 675-6340

Grinnell Fire Protection Systems Co. Ltd.
3291 Marentette Avenue
Windsor N8X 4G4
(519) 966-1910

Metro Sprinkler and Fire Systems Ltd.
247 Carrier Dr., Unit 3
Rexdale M9W 5Y9
(416) 741-6964

Niagara Mechanical Contractors
12 Penn Drive, Unit 2
Weston M9L 2A9
(416) 749-6031

Nicholls Radtke and Associates Ltd.
145 Hemstead, Box 4494, Station D
Hamilton L8V 4S7
(416) 387-3705

The Rowan Sprinkler Co. Ltd.
22 Lock Street
St. Catharines L2N 5B5
(416) 935-5253

St. Clair Sprinkler Systems, Inc.
1300 Plank Road
Sarnia N7T 7H5
(519) 336-7473

Troy Sprinkler Limited
2A Christie Drive, Box 428
Beamsville L0R 1B0
(416) 563-4889

Viking Fire Protection Ltd.
R.R. #3
Gananoque K7G 2V5
(613) 382-2842

Viking Fire Protection Ltd.
80 Colonnade Road
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(613) 225-9540

Viking Fire Protection Ltd.
106 Advance Road
Toronto M8Z 2T7
(416) 233-1246

Vipond Automatic Sprinkler Co. Ltd.
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(519) 743-5246

Vipond Automatic Sprinkler Co. Ltd.
30 Midpark Crescent
London N6N 1B1
(519) 681-2233

Vipond Automatic Sprinkler Co. Ltd.
6380 Vipond Drive
Mississauga L5T 1A1
(416) 678-7060

Vipond Automatic Sprinkler Co. Ltd.
34 Bentley Avenue
Ottawa K2E 6T8
(613) 225-0538

Vipond Automatic Sprinkler Co. Ltd.
685 Harold Crescent
Thunder Bay P7C 5H6
(519) 623-1214

York Fire Protection
159 Denison Street
Markham L3R 1B5
(416) 495-6680

Quebec

La Compagnie de Systemes de Protection Incendie Grinnell Ltee,
1070 rue Beaulac,
St-Laurent H4R 1R7
(514) 336-7040

Extincteurs Automatiques Vipond Ltee,
295, avenue Labrosse,
Pointe Claire H9R 1A3
(514) 695-1032

Les Gicleurs Automatiques Ltee,
601, rue Stinson,
St-Laurent H4N 2E1
(514) 747-1154

Protection Incendie Viking Ltee,
C.P. 100 (Cartierville),
Montreal H4K 2j4
(514) 332-5110

Saskatchewan

Grinnell Fire Protection Systems Co. Ltd.
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Regina S4P 3B4
(306) 949-6060

Viking Sprinkler Co. Ltd.
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Saskatoon S7K 6A4
(306) 653-3640

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227—7th Avenue
Regina S4N 5H5
(306) 359-1033

Vipond Automatic Sprinkler Co. Ltd.
825C Cynthia Street West
Saskatoon S7L 6B7
(306) 665-7858

Western Automatic Sprinklers, Inc.
2327 Lorne Street
Regina S4P 2N1
(306) 352-0080

Arbitrators / Negotiators

National Public Employer Labor Relations Association (NPELRA)

The NPELRA, established in 1970, is the national professional organization for public sector individuals who have the responsibility for representing public management in the employee relations arena.

The membership of the NPELRA is composed of the leading management advocates in the country, including experts in all areas of public sector employee relations.

The following is the affiliate membership of the NPELRA, which is composed of attorneys and consultants who are not employees of a public employer but who represent and actively work for the interests of public management and who solely represent and support the interests of management in employee relations matters.

Alaska

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(907) 276-3125

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(213) 645-6492

Richard N. Fisher, Esq.
O'Melveny and Myers
611 W. 6th St.
Los Angeles 90017
(213) 620-1120

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Goldstein, Freedman and Klepetar
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Suite 890
Los Angeles 90045
(213) 645-6492

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Human Resources
City of Anaheim
200 S. Anaheim Blvd.
Anaheim 92805
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Philip F. Stone, Jr.
Philip F. Stone and Associates
Labor Relations Consultants
8622 Bluffdale Dr.
Sun Valley 91352
(213) 768-4590

Delaware

N. Maxson Terry, Jr.
Kent County Attorney
48 The Green
Dover 19901
(302) 734-7588

Florida

Thomas M. Gonzalez, Esq.
Shackleford, Farrior, Stallings and Evans, P.A.
P.O. Box 3324
Tampa 33601
(813) 273-5000

Illinois

Mark L. Juster, Esq.
Dorfman, Cohen, Laner and Muchin, Ltd.
One IBM Plaza, Suite 3301
Chicago 60611
(312) 467-9800

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Labor Dept.
Hoeppner, Wagner and Evans
P.O. Box 369
Valparaiso 46383

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Meardon, Sueppel, Downer and Hayes
122 S. Linn St.
Iowa City 52240
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Louisville 40202
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Venable, Baetjer and Howard
1800 Mercantile Building
Two Hopkins Plaza
Baltimore 21201
(301) 244-7676

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Murphy, Lamere and Murphy
South Shore Plaza
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Braintree 02184
(617) 848-1850

Allan W. Drachman, Esq.
Holland, Crowe and Drachman
A Professional Corporation
185 Devonshire St.
Boston 02210
(617) 482-8250

Michigan

Louis D. Beer
Kemp, Klein, Endelman and Beer, P.C.
3000 Town Center
Suite 2700
Southfield 48075
(313) 355-3600

Minnesota

George R. Bloom, President
Industrial Rels. Associates
2909 Wayzata Blvd.
Minneapolis 55405
(612) 374-9100

Peter Etzell
Labor Counsel
Etzell, Sinclair and Johnson
P.O. Box 1998
North Mankato 56001
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Frank Madden
Attorney-at-Law
Heur, Madden, Graesner and Bushay
Suite 200, Talmadge Bldg.
1219 Marquette Ave.
Minneapolis 55408
(612) 333-3160

Douglas P. Seaton, Esq.
Popham, Haik, Schnobrich, Kaufman and Doty
4344 IDS Center
Minneapolis 53402
(612) 333-4800

Cyrus F. Smythe
Labor Rel. Associations, Inc.
7501 Golden Valley Rd.
Golden Valley 55427
(612) 546-1470

Bernard E. Steffen
Steffen, Munstenteiger, Bearse, Beens, Parta and Peterson
403 Jackson St., Suite 301
Anoka 55303
(612) 427-6300

Peter E. Stolley
City Administrator
City of Northfield
801 Washington St.
Northfield 55057
(507) 645-8833

New Jersey

Gerald L. Dorf, Esq.
Dorf and Glickman, P.A.
2376 St. Georges Ave.
Rahway 07065

New York

Peter A. Bee, Esq.
Bee and DeAngelis
170 Old Country Rd.
Mineola 11501
(516) 746-5599

Stephen J. Vollmer
Bond, Schoeneck and King
One Lincoln Center
Syracuse 13202
(315) 422-0121

Ohio

Dean E. Delinger
Smith and Schnecke
29th Floor DuBois Tower
511 Walnut St.
Cincinnati 45202
(513) 226-6527

Oklahoma

Jim L. Lindsey
Hood and Lindsey
1606 First National Bank Building
Tulsa 74103
(916) 583-5825

Oregon

Les Smith
Bullard, Korshoj, Smith and Jernstedt
1291 SW 12th Ave.
Portland 97205
(503) 248-1134

South Carolina

Charles Caulkins
Thompson, Mann and Hutson
The Daniel Building
Greenville 29602
(803) 242-3200

Vermont

Bennett Evans Greene
RD #2
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(802) 863-4453

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Research Director
Public Service Research
8330 Old Courthouse Rd.
Suite #600
Vienna 22180
(703) 790-0700

Elmer R. Jeter
Director of personnel
P.O. Box 1531
Norfolk 23501
(804) 441-2323

Washington

Otto G. Klein, III
Carmody, Syrdal, Danelo and Klein, P.C.
24th Floor
Fourth and Blanchard Bldg.
Seattle 98121
(206) 464-1490

Wisconsin

Ronald J. Rutlin, Esq.
Mulcahy and Wherry, S.C.
408 3rd St.
Wausau 54401
(715) 842-0502

Federal Emergency Management Agency

Organization

The Director of the Federal Emergency Management Agency (FEMA) reports to the President and works closely in emergency management matters with the National Security Council, the Cabinet, and the White House staff.

Personnel

FEMA has a staffing level of approximately 2,500.

National Headquarters

FEMA Headquarters is located at Federal Center Plaza, 500 C Street, S.W., Washington, D. C. 20472.

Regional Offices

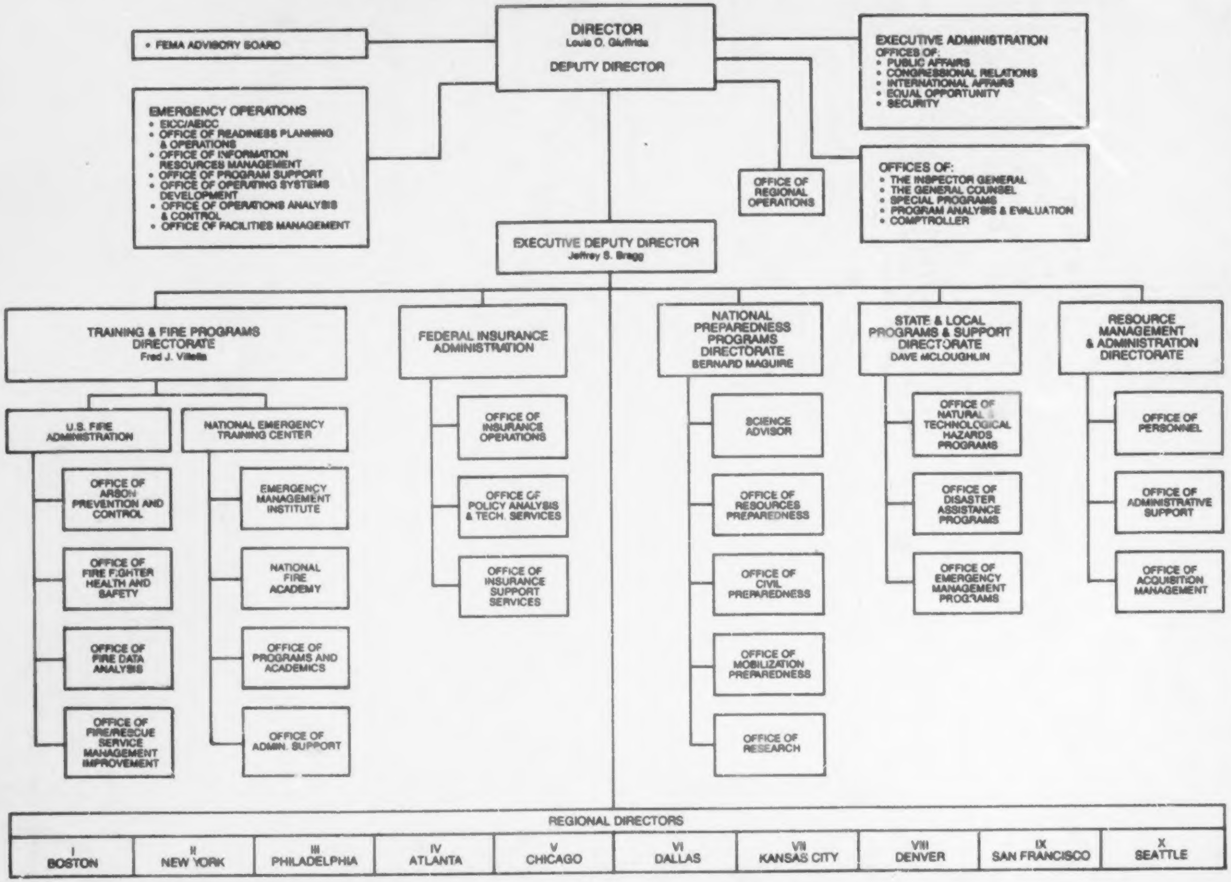
There are 10 FEMA Regional Offices. Each office is managed by a Regional Director who reports to the FEMA Director and is responsible for all FEMA programs in the region. FEMA Regional Offices are:

Region I (Boston)
442 J. W. McCormick, POCH
Boston, MA 02109
(617) 223-4741

Region II (New York)
26 Federal Plaza
New York, NY 10278
(212) 264-8980

Region III (Philadelphia)
Curtis Building, 7th Floor
6th and Walnut Streets
Philadelphia, PA 19106
(215) 597-9416

ORGANIZATION OF FEDERAL EMERGENCY MANAGEMENT AGENCY


DIRECTOR
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DEPUTY DIRECTOR
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• EICC/AEICC
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• OFFICE OF INFORMATION RESOURCES MANAGEMENT
• OFFICE OF PROGRAM SUPPORT
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• CONGRESSIONAL RELATIONS
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• EQUAL OPPORTUNITY
• SECURITY
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• THE GENERAL COUNSEL
• SPECIAL PROGRAMS
• PROGRAM ANALYSIS & EVALUATION
• COMPTROLLER
OFFICE OF REGIONAL OPERATIONS
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Jeffrey S. Bragg
TRAINING & FIRE PROGRAMS DIRECTORATE
Fred J. Villella
U.S. FIRE ADMINISTRATION
OFFICE OF ARSON PREVENTION AND CONTROL
OFFICE OF FIRE FIGHTER HEALTH AND SAFETY
OFFICE OF FIRE DATA ANALYSIS
OFFICE OF FIRE/RESCUE SERVICE MANAGEMENT IMPROVEMENT
NATIONAL EMERGENCY TRAINING CENTER
EMERGENCY MANAGEMENT INSTITUTE
NATIONAL FIRE ACADEMY
OFFICE OF PROGRAMS AND ACADEMICS
OFFICE OF ADMIN. SUPPORT
FEDERAL INSURANCE ADMINISTRATION
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OFFICE OF MOBILIZATION PREPAREDNESS
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STATE & LOCAL PROGRAMS & SUPPORT DIRECTORATE
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OFFICE OF NATURAL & TECHNOLOGICAL HAZARDS PROGRAMS
OFFICE OF DISASTER ASSISTANCE PROGRAMS
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RESOURCE MANAGEMENT & ADMINISTRATION DIRECTORATE
OFFICE OF PERSONNEL
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III PHILADELPHIA
IV ATLANTA
V CHICAGO
VI DALLAS
VII KANSAS CITY
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IX SAN FRANCISCO
X SEATTLE

Region IV (Atlanta)
Gulf Oil Building, Suite 664
1375 Peachtree Street, N.E.
Atlanta, GA 30309
(404) 881-2400

Region V (Chicago)
300 South Wacker Drive, 24th Floor
Chicago, IL 60606
(312) 353-1500

Region VI (Dallas)
Federal Regional Center, Room 206
Denton, TX 76201
(817) 387-5811

Region VII (Kansas City)
Old Federal Office Building, Room 300
Kansas City, MO 64106
(816) 374-5912

Region VIII (Denver)
Federal Regional Center, Bldg. 710
Denver, CO 80225
(303) 234-6542

Region IX (San Francisco)
211 Main Street, Room 220
San Francisco, CA 94105
(415) 556-8794

Region X (Seattle)
Federal Regional Center
Bothell, WA 98021
(206) 481-8800

United States Fire Administration

The U. S. Fire Administration (USFA), an office of the Federal Emergency Management Agency, is headed by Acting Administrator Edward M. Wall. The USFA is divided into four offices: Fire Policy and Coordination; Fire Fighter Health and Safety; Fire Prevention and Arson Control; and Fire Data and Analysis. With input from the members of the Joint Council of National Fire Service Organizations, priorities were established for each of these program areas to guide allocation of the resources of the USFA most effectively to meet its primary goal: Improving firesafety in the United States.

Office of Fire Policy and Coordination

Priorities for this office include overseeing the management and administration activities of the Fire Administration and conducting programs which impact on fire and rescue service management practices.

Office of Fire Fighter Health and Safety

Priorities for this office include assisting in the development of improved protective clothing and equipment, establishing preventive programs, and improving diagnostic and immediate care procedures for fire victims.

Office of Fire Prevention and Arson Control

Priorities for this area include developing a pro-active program for fire safety codes, promoting development and use of new fire protection technology, and improving arson information management.

Office of Fire Data and Analysis

Priorities for this office are to ensure effective fire data collection on a national basis; to develop a data bank of timely, accurate, and retrievable information; and to continue analysis of major and/or unusual fires.

For further information regarding the U. S. Fire Administration contact: United States Fire Administration, National Emergency Training Center, 16825 South Seton Avenue, Emmitsburg, Maryland 21727.

National Fire Academy

The National Fire Academy (NFA) was established under the National Fire Prevention and Control Act of 1974 (Public Law 93-498) to advance the professional development of the fire service and other professions engaged in fire prevention and control. Joseph L. Donovan serves as the Academy Superintendent.

Since 1977, the Academy has been offering programs in fire science technology, management and planning, and educational methods. Courses have been delivered to nearly 5,000 fire service officers, fire fighters, instructors, planners, professionals in related trades, and federal and state fire officials in more than 100 locations around the country.

National Fire Academy courses are designed to train the trainer, that is, to provide training to individuals who will then train other personnel, creating a multiplier effect. In this way, the impact of the Academy can be greatly increased by offering NFA courses to a much larger audience than could be accommodated at the Academy.

A milestone in the effort to upgrade the level of advanced training available to the fire service was the formal opening of the Academy's resident campus on January 21, 1980. The Academy is the national focal point for fire prevention and control training, providing fire service professionals, both volunteer and career, access to significant advances in technological and management areas. The Academy also offers training to individuals in allied professions — code enforcers, architects, city managers and administrators, and planners.

Through systematic research, analysis of student critiques, and consultation with fire service organizations and leaders, the Academy continually revises, improves, and expands its curricula to meet national priorities. In Fiscal Year 1984, 24 resident courses will be offered, the most comprehensive fire training curricula to date.

The NFA is one of two divisions of the Federal Emergency Management Agency's National Emergency Training Center (NETC) and now shares its campus at Emmitsburg, Maryland, with the Emergency Management Institute (EMI), the second division of the NETC. The EMI offers a wide range of courses to help state and local leaders more effectively prepare for, respond to, and mitigate the full spectrum of natural and man-made emergencies.

The Campus and Facilities

The 107-acre campus is shared by the National Fire Academy and the Emergency Management Institute. Fully equipped, air-conditioned classrooms accommodate up to 1,000 students at one time. Four dormitories can house 325 students in single occupancy rooms, and dining facilities are located on campus.

Educational buildings contain modern equipment for laboratory exercises as well as classrooms, "break-out" rooms, and a 240-seat lecture hall. An arson fire scene laboratory, a fire protection systems laboratory, and a fire tactics simulator were established recently. A laboratory containing a variety of microcomputers provides students with practical hands-on experience in a new course, Use of Microcomputers for Fire Service Management, and other Academy courses such oas Arson Investigation. The library offers a full range of services to support student assignments. Print and nonprint materials are available on fire-related topics. Materials may be borrowed and used by all staff and students during the library's day, evening, and weekend hours. The Emmitsburg facility also contains a modern student center with pub, a waterside log cabin, tennis courts, gymnasium, and indoor pool for on-campus recreation.

The campus is located a few miles south of the Pennsylvania border, 70 miles northwest of Baltimore, and 75 miles north of Washington, D. C. Points of interest nearby include national and state parks, historic Gettysburg, and outdoor recreational areas featuring golf, swimming, and skiing.

Food, Lodging, and Travel Arrangements

The National Emergency Training Center will refund the cost of transportation to and from the campus for other than private industry and federal employees. These sponsoring organizations must pay the cost of transportation for their employees. In addition, federal and private employees are required to pay a fee of 5 a day for lodging when attending the National Fire Academy. With these exceptions, students pay only 11 a day for meals. (This amount may change depending on the negotiated food services contract.) Students are billed for meals, based on the length of stay, at the time they are notified of admission acceptance. All instructional materials and basic student supplies are provided by NETC.

Reimbursement for travel costs to the student, including travel by common carrier or by privately owned vehicle, are initiated when the student registers at NETC. Negotiations currently are underway with the Scheduled Airlines Travel Office (SATO) to provide a ticketing service for NETC students. SATO is a service provided by the U. S. Scheduled airlines.

Policy dictates that the option to travel by privately owned vehicle (which is encouraged) is available when the one-way distance between the student's residence and the campus does not exceed 600 miles. Those who drive are asked to economize by carpooling with other applicants from the same area.

Students must travel by the most economical method as determined by NETC. The closest major transportation centers to Emmitsburg are Washington, D. C., and Baltimore, Maryland, both of which are approximately 1 1/2 hours away by car. For those students living beyond a reasonable driving range, ground transportation is provided to and from Dulles International, Baltimore-Washington International, and Washington National Airports and the campus on a schedule provided with the notification of acceptance.

Board of Visitors

Members of the Board of Visitors for the National Fire Academy are outstanding professionals in the fields of firesafety, prevention, and control; research and development in fire protection; and in related areas such as government service, training and education, and the private sector.

The function of the Board is to review annually the Academy's program and to make comments and recommendations to the Director on the operation of the Academy.

Larry M. Bonnafon, Chairman
Chief, Louisville Division of Fire
Louisville, Kentucky

Louis J. Amabili, Vice Chairman
Chairman, Joint Council of National Fire Service Organizations
Director, Delaware State Fire School
Dover, Delaware

J. Bryan Collester
Associate Professor, Principia College
Elsah, Illinois

E. James Monihan
Chairman, National Volunteer Fire Council
Lewes, Delaware

Jerrold S. Pressman
President, Master Protection Enterprises
Los Angeles, California

Joseph M. Redden
Assistant Vice President
National Fire Protection Association
Quincy, Massachusetts

H. J. Roux
Coordinating Manager, Product Fire Performance
Armstrong World Industries
Lancaster, Pennsylvania

For additional information on the National Fire Academy, contact: your state fire training agency or Office of Admissions and Registration, National Emergency Training Center, 16825 S. Seton Avenue, Emmitsburg, MD 21727, (301) 447-6771 or (800) 638-9800 (Toll Free).

Fire Academy Curricula

The NFA resident courses are divided into eight program "chairs": 1) Education (including Public Education); 2) Management Technology (including Emergency Medical Service); 3) Executive Development; 4) Organization Development; 5) Arson; 6) Hazardous Materials; 7) Community Resource Preservation; 8) Emergency Incident Policy and Analysis.

Accreditation

Courses presented at the National Fire Academy are equivalent to those given at the college/university level. Academy students may be eligible for college credits when completing certain courses in the resident program. Although the Academy itself is not an accredited institution, college credits can be transferred to a degree program already under way.

Courses presently available in each of the Academy series are described in the Calendar section of the *Fire Almanac*, which also includes a 1984 schedule of course offerings at the Academy.

The Fellowship Program

The National Fire Academy Fellowship Program is designed to provide a coordinated, highly intensified approach to training. The Fellowship student is a member of a unique group involved in an extended learning experience at the Academy. Students are provided the opportunity to attend a series of Academy courses scheduled in sequence during a selected time period. They may choose an across-the-board sampling of courses or concentrate on those offered in their area of expertise. However, the acceptance criteria must be met for any course selected. To successfully complete the Fellowship Program, students must attend Academy courses for at least eight weeks.

Senior Fire Prevention Officer Program

This six-week program provides the experienced fire inspector with information and skill development for senior inspector responsibility. First it covers general technical fire inspections, then moves to the more advanced needs in specialized inspection and testing of detection and protection systems. Finally, it addresses the development, application, and enforcement of codes. The program includes Fire Prevention Specialist II, Managing the Code Process, and Plans Review for Inspectors.

Field Programs

National Fire Academy field programs are intended to supplement and complement state and local fire training efforts. The majority of these field courses are designed to be ultimately handed off to state and local fire training systems. Through train-the-trainer instructor workshops (a system of demonstration course deliveries) and hand-off to state and local fire training agencies, National Fire Academy courses are made available to those individuals unable to attend resident courses.

Academy field courses are usually between 12 and 14 hours long and are normally conducted on weekends. They are short-term, intensive training experiences, designed to provide a maximum opportunity for active student participation. Field courses are cooperatively selected and co-sponsored by the National Fire Academy and state fire training agencies. This national/state linkage supplements existing state and local fire training efforts.

In the past three years, over 30,000 fire/rescue personnel have attended 653 course deliveries at the local level. In fiscal year 1984, over 240 deliveries are scheduled, and it is anticipated that 12,000 to 14,000 fire and allied professionals will take advantage of these training opportunities. Field program offerings for 1984 are listed in the Calendar section of the *Fire Almanac*.

Campus Weekend Educational Opportunities

Academy field courses are offered on selected weekends at the National Emergency Training Center campus at Emmitsburg, Maryland. These weekend courses provide students additional opportunities to visit the campus and participate in Academy courses. Students in these weekend courses receive lodging, tuition, and course materials at no cost. There is a nominal charge for meals provided in the campus dining hall. Weekend courses to be offered during fiscal year 1984 are:

Hazardous Materials Incident Analysis	Jan. 28-29
Fire Service Supervision: Increasing Personal Effectiveness	Feb. 04-05
Firefighting Risk Analysis: Systems Approach	Feb. 18-19
Fire Service Supervision: Increasing Team Effectiveness	Mar. 03-04
Interpersonal Relations for Fire Service Supervisors: An Introduction	Mar. 03-04
The Incident Command System and Structural Firefighting	Mar. 17-18
Firefighting Resource Management Planning	Mar. 24-25
Building Construction: Principles, Wood and Ordinary	July 28-29
Building Construction: Noncombustible and Fire-Resistive Construction	Aug. 18-19

For registration and other information, contact the Office of Admissions and Registration, National Emergency Training Center, 16825 South Seton Avenue, Emmitsburg, MD 21727.

State Authorities with Fire Interests

State Fire Marshals

Forty-eight states have offices at the state level to oversee certain phases of fire protection (see Table). The chief fire protection administrator at the state level is usually called the state fire marshal. The organization and size of state fire marshal offices differs from state to state. Most fire marshals receive their authority from the state legislature and are answerable to the governor, a high state officer, or a fire commission. In some states, the fire marshal's office may be a division of the state insurance department, state police, state building department, state commerce division, or other state agency. A few are organized as separate agencies.

State fire marshals' offices normally function in those areas that go beyond the scope of municipal, county, or fire district organizations. Depending on the authority outlined in enabling legislation or the administrative regulations, state fire marshal offices may have combinations of responsibilities in the following areas: code enforcement; fire prevention inspections; plans review; fire and arson investigation; fire data collection; fire data analysis; fire service training; public fire education; fire legislation development; explosives and other hazardous materials regulation; manufactured housing regulations; mobile home regulations; electrical inspections, and state agency and public fire protection consulting.

State fire marshals may share responsibility with local fire officials, or each may have specifically defined areas of concern. Local fire protection officials are sometimes granted the authority to act as agents for the state in stipulated areas of inspection, enforcement, and investigation.

Summary of State-Level Fire Authorities

A brief description of the enforcement agencies in each of the fifty states and the District of Columbia having jurisdiction in fire-related matters, and a brief summary of the general nature of the laws and regulations in effect in 1983 are as follows:

(NOTE: Due to pending legislation and other difficulties, information about the following states has not been updated by NFPA since 1976: Delaware, Indiana, and New Hampshire.)

Functions of the State Fire Marshal's Office

STATE	Code Enforcement	Fire & Arson Investigation	Plans Review	Fire Prevention Inspections	Fire Data Collection	Fire Data Analysis	Fire Service Training	Public Fire Education	Fire Legislation Development	Manufactured Housing Regulations	Mobile Home Regulations	Electrical Inspections	Boiler Inspections	Distribution of Funds to Fire Dept.
Alabama	X	X	X	X	X	X	X	X		X	X	X		
Alaska	X	X	X	X	X	X	X	X	X					
Arizona	X	X	X	X	X	X	X	X	X					
Arkansas	X	X	X	X	X	X	X	X	X					
California	X	X	X	X	X	X	X	X	X					
Colorado[1]				NONE										
Connecticut	X	X	X	X	X	X	X	X	X				X	
Delaware	X	X	X	X	X	X			X					
Florida	X	X		X	X	X	X	X	X					
Georgia	X	X	X	X				X			X	X		
Hawaii[2]				NONE										
Idaho	X	X		X	X	X			X	X	X	X		
Illinois	X	X	X	X	X	X			X					
Indiana	X	X	X	X	X	X	X	X	X	X	X	X		
Iowa	X	X	X	X	X	X		X	X	X	X			
Kansas	X	X	X	X	X				X					
Kentucky	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Louisiana	X	X	X	X	X	X	X	X	X	X	X	X	X	
Maine	X	X	X	X	X		X	X	X					
Maryland	X	X	X	X	X	X		X	X			X		
Massachusetts		X			X									
Michigan	X	X	X	X	X	X	X		X					
Minnesota	X	X	X	X	X				X		X			
Mississippi	X	X		X						X	X			
Missouri	X	X	X		X	X			X					
Montana	X	X	X	X	X	X		X	X					
Nebraska	X	X	X	X	X	X		X	X	X	X	X		
Nevada	X	X	X	X			X		X					
New Hampshire	X	X	X	X	X	X		X	X	X		X		
New Jersey[3]				X	X									
New Mexico	X-	X		X	X	X	X	X	X					X
New York[4]				X	X	X	X	X	X					
North Carolina	X		X				X	X	X	X	X	X		
North Dakota	X	X	X	X	X	X		X	X					X
Ohio	X	X	X	X	X	X	X	X	X					
Oklahoma	X	X	X	X	X		X	X	X					
Oregon	X	X	X	X	X	X	X	X	X					
Pennsylvania		X			X									
Rhode Island	X	X	X	X	X									
South Carolina	X	X	X	X				X	X	X	X			
South Dakota	X	X	X	X	X	X		X	X					
Tennessee	X	X	X	X	X	X		X	X	X	X	X	X	
Texas	X	X		X	X	X		X						
Utah	X	X	X	X	X	X	X		X					
Vermont		X			X									
Virginia	X		X											
Washington	X	X	X	X	X	X		X	X					
West Virginia	X	X	X	X	X	X	X	X	X				X	
Wisconsin		X										X		
Wyoming	X	X	X	X	X	X	X	X				X		
District of Col.	X	X	X	X	X	X	X	X	X					

Footnotes:

1. Colorado — No state fire marshal's office.
2. Hawaii — State fire marshal's office disbanded April, 1979 — all functions transferred to county fire marshals' offices.
3. New Jersey — State fire marshal has authority over state owned buildings only; voluntary collection of fire loss statistics.
4. New York — State Fire Administrator.
5. Vermont — Code enforcement and inspections conducted by Dept. of Labor and Industry.

Alabama: The Office of the State Fire Marshal is a division of the Department of Insurance. The fire marshal, his assistant, and his deputies are state law enforcement officers with full general powers of peace officers, as well as subpoena power. The division enforces state laws regarding fires, explosions, arson, and fireworks, and conducts investigations concerning these laws. The division has adopted the Standard Building Code, Standard Fire Prevention Code, and the Codes and Standards of NFPA. The Fire Marshal's Office conducts inspections of hotels, motels, day-care centers, jails, prisons, and various other occupancies covered by the adopted codes. A barrier-free design code and mobile home blocking and anchoring code have been written and adopted by the fire marshal. The mobile home section of the office conducts inspections of mobile homes, acting as a State Administrative Agency for HUD. The fire marshal serves as a member of the State LP-Gas Board and the Fire Fighters Personnel Standards and Education Commission. The mobile home section also regulates modular construction.

Roy L. Thornell
State Fire Marshal
Alabama Dept. of Insurance
445 South McDonough St.
Montgomery, AL 36130
(205) 832-5844

Alaska: The Office of State Fire Marshal is organized in the Division of Fire Prevention of the Department of Public Safety. The fire marshal enforces the arson law, the Alaska Fire Safety Code governing conditions hazardous to life and property from fire and explosion, and the Uniform Building Code; but local codes are adopted and enforced locally. The National Electrical Code is administered by the Department of Labor.

Director, State Fire Marshal
Division of Fire Prevention
Alaska Dept. of Public Safety
Pouch 6313
Anchorage, AK 99502
(907) 272-2406

Arizona: The state fire marshal operates under the Division of Emergency Services. The fire marshal adopts and enforces minimum fire prevention and firesafety rules and regulations and has adopted the Uniform Fire Code and NFPA 101, *Life Safety Code* as it pertains to schools, health care facilities, and institutions. The fire marshal also conducts fire investigations and assists cities and counties in regulation enforcement, maintains a statewide reporting system, and provides fire prevention and fire fighting training to fire departments statewide.

B. Paul Saunders
State Fire Marshal
Division of Emergency Services
5636 E. McDowell Rd.
Phoenix, AZ 85008
(602) 273-9725

WE WANT TO KNOW . . .
if a name, an address, or a phone number has changed; if there's an upcoming event, a new program or course, a new publication being offered. If you have more current information than is contained in this *Almanac*, know something that should be included in this book, or just have something interesting about the fire protection scene that you want to contribute, please let us know. Write: Editor, *Fire Almanac*, NFPA, Batterymarch Park, Quincy, MA 02269. All suggestions will receive our careful attention.

Arkansas: The Director of State Police is the state fire marshal. The Fire Marshal Law covers: arson, exits, fire escapes, fire equipment, fireworks, combustibles, and explosives. LP-Gas is regulated by the LP-Gas Board. There is a State Fire Prevention Code which is substantially the Fire Prevention Code promulgated by the American Insurance Association.

Lieutenant Ray Carnahan
Arkansas Dept. of State Police
Fire Marshal Section
#3 Natural Resources Dr.
P.O. Box 5901
Little Rock, AR 72215
(501) 224-3103

California: The Office of the State Fire Marshal is a governmental department administered by the state fire marshal who is appointed by the governor. Title 19 of the California Administrative Code contains regulations and standards relative to buildings and public places, fabrics and tents, fire extinguishers and alarms, fireworks, explosives and flammable liquids. The fire marshal maintains a fire research laboratory, has an arson and bomb investigation unit, collects fire data from all fire departments in the state, and manages the California Fire Service Training and Education System.

Ronald W. Bogardus, P.E.
State Fire Marshal
State of California
7171 Bowling Dr., Suite 600
Sacramento, CA 95823
(916) 427-4161

Colorado: There is no state fire marshal. The fire chiefs of the municipalities and fire protection districts are responsible for enforcement of state and local fire protection laws. The Industrial Commission of Colorado is empowered by statute to enforce certain recognized fire and safety codes and standards. The commission reviews and approves all new school construction plans. The State Inspector of Oils enforces all standards covering the use of all liquid flammable fuel products and systems including LP-Gas Regulations.

Connecticut: The Commissioner of Public Safety is ex-officio the state fire marshal. The Bureau of State Fire Marshal is commanded by a deputy state fire marshal, designated as such by the commissioner. The law contains provisions for a firesafety code covering all occupancies other than one- and two-family dwellings and places used for manufacturing purposes. The code covers schools, hospitals, convalescent homes, homes for the aged, places of public assembly, hotels, rooming houses, and child day-care centers. Other regulations of the state fire marshal cover circuses and carnivals; storage and transportation of flammable liquids and liquefied petroleum gas; storage and transportation of hazardous chemicals; the operation of motion picture theaters; and other fire hazards. There is a Fireworks Law and an Arson Law. The State Labor Department is responsible for firesafety in factories. A State Building Code is administered by the Commissioner of Public Safety also, which regulates all construction in the state.

Captain William R. Kirkby
Deputy State Fire Marshal
Bureau of State Fire Marshal
Division of State Police
Connecticut Dept. of Public Safety
294 Colony St.
Meriden, CT 06450
(203) 238-6620

State Commission on Fire Prevention
and Control
Maurice F. McCarthy, Chairman
George E. Luther, State Fire Administrator
294 Colony Street
Meriden, CT 06450
(203) 238-6587

Delaware: There is a state fire marshal. He enforces laws covering arson, fireworks, explosives, fire escapes and fire prevention standards. There is also a State Fire Prevention Commission which has adopted fire regulations under the Delaware Code, Fire Protection Rules and Regulations.

J. Benjamin Roy, Jr.
State Fire Marshal
State of Delaware
R.D. #2, Box 166A
Dover, DE 19901
(302) 736-4393

District of Columbia: The chief of the fire department is responsible for supervising the enforcement of the D.C. Fire Prevention Code. This responsibility is delegated to the deputy fire chief, Fire Prevention Division. The division is responsible for the investigation of fires and the inspection of all buildings, except private dwellings and public buildings or premises owned or under the exclusive control of the United States, relative to LP-Gas installations, hazardous operations, storage, and other common fire hazards. Natural gas, LP-Gas piping, electrical regulations and the D.C. Building Code are enforced by the Bureau of Building, Housing and Zoning.

Hubert A. Clarke, Jr.
Fire Marshal
D.C. Fire Dept. Headquarters
614 H St., NW, Room 406
Washington, D.C. 20001
(202) 745-2255

Florida: The Treasurer-Insurance Commissioner serves as the state fire marshal. He has the authority to carry firearms and to make arrests, searches, and seizures. He is responsible for fire protection, fire incident reporting, arson investigation, and regulations covering fire extinguishers and fire protection systems, explosives, flammable liquids, and common hazards. The state fire marshal is responsible for setting minimum standards for the employment and training of fire fighters. The State Fire Marshal's Office maintains a State Fire College for training members of the fire service and a laboratory facility for testing fire equipment and evidence obtained in fire investigations.

Dennis R. Dewar
Director
Division of State Fire Marshal
Larson Bldg., Room 471
Tallahassee, FL 32301
(904) 488-8268

Georgia: The Office of State Fire Marshal is under the comptroller general. The Georgia Safety Fire Law contains comprehensive provisions covering the control of flammable liquids and explosives, and it provides for fire investigations and enforcement of arson statutes. The Safety Fire Commissioner promulgates firesafety regulations pertaining to certain buildings and to schools, hospitals, nursing and old age homes, hotels, motels, places of assembly, jails, prisons, and certain other uses. The state has adopted NFPA *101, Life Safety Code* and many NFPA standards relating to construction and hazardous materials. The commissioner promulgates rules and regulations for the licensing of manufactured home dealers and manufacturers.

John R. Gore, Jr.
State Fire Marshal
State of Georgia
State Capitol
Atlanta, GA 30334
(404) 656-2064

Hawaii: On July 1, 1979, the Office of the State Fire Marshal was abolished and all functions and responsibilites were transferred to the respective counties. Responsibilities include investigation of fires; inspection of property; review of construction plans for schools, hospitals, institutions, hotels, places of assembly and office and industrial occupancies; and review of construction plans for flammable liquid and gas installations. A State Fire Council composed of the fire chiefs of the four counties and Chief of the Fire Prevention Bureau of the Honolulu Fire Department adopted a State Model Fire Code which serves as the basis for county fire codes. The State Model Fire Code adopted the Uniform Fire Code. The four counties have also adopted various editions of the Uniform Building Code. Regulation of explosives and blasting agents is the responsibility of the State Department of Labor and Industrial Relations.

Idaho: The Idaho State Fire Marshal, a division of the Idaho Department of Insurance, enforces regulations covering fire prevention, inspection, and arson control. The Uniform Fire Code, 1982 edition, has been adopted statewide as the minimum standard for fire prevention. Regulations concern all properties except single family residential and farms of more than five (5) acres. All other fire-related codes such as electrical, building, mechanical, etc., are under the Department of Labor and Industrial Services.
William K. Wallis
State Fire Marshal
Idaho Dept. of Insurance
700 W. State St.
Boise, ID 83620
(208) 384-2250

Illinois: The Office of State Fire Marshal has been a separate state agency under the governor since 1977. The state fire marshal, as executive director, is appointed by the governor with the advice and consent of the State Senate. The state fire marshal's responsibilities include fire prevention investigation, recording of Fire Protection Districts, issuing permits for gasoline and flammable liquid storage, assignment of unprotected areas for fire protection, and the collection of fire data, which is performed in accordance with the National Fire Incident Reporting System (NFIRS). The office also has a Division of Personnel Standards and Education which has the responsibility for encouraging local fire departments to improve the training of fire personnel under a career development and certification program. The office also investigates the cause and origin of fires as a member of the Illinois Arson Task Force.
Jack Henry Carter
State Fire Marshal
Office of the State Fire Marshal
Division of Administration
3150 Executive Park Dr.
Spingfield, IL 62706
(217) 782-9889

Indiana: The state fire marshal is responsible for enforcing laws relative to arson, exits, places of public assembly, schools, hospitals, and institutions. There are regulations controlling flammable liquids, LP-Gas, fireworks, and other common fire hazards. There is also a State Building Code enforced by the Administrative Building Council.
William C. Goodwin
State Fire Marshal
State Office Bldg., Room 502
100 N. Senate Ave.
Indianapolis, IN 46209
(317) 633-4778

Iowa: The state fire marshal is in the Department of Public Safety. The Fire Marshal Law contains comprehensive provisions covering arson, explosives, places of public assembly, hospitals, institutions, nursing homes, and fire prevention education. Regulations cover flammable liquids, LP-Gas, building exits, electrical wiring, and other common hazards. The Labor Department regulates industrial processes and electrical wiring in industrial occupancies.

Wilbur R. Johnson
State Fire Marshal
State Office Bldg.
523 E. 12th St.
Des Moines, IA 50319
(515) 281-5821

Kansas: The Office of State Fire Marshal is a separate governmental department reporting directly to the governor. The office is responsible for arson investigation, control of fireworks and explosives, and the promulgation and enforcement of regulations governing bulk oil stations, LP-Gas, retail gasoline stations, and gasoline transport trucks. The fire marshal is also responsible for the inspection of schools, health care facilities, places of assembly, mercantile, office, industrial, storage and miscellaneous structures. Special inspections of hazardous conditions or buildings are made upon request of fire chiefs or other city officials. The Fire Marshal's Office also acts as the focal point for collection and dissemination of fire loss information from fire departments and insurance companies operating in Kansas.

Edward C. Redmon
State Fire Marshal
State Fire Marshal Dept.
Mills Bldg., Suite 203
109 W. 9th
Topeka, KS 66612
(913) 296-3401

Kentucky: The Office of State Fire Marshal is organized under the Department of Housing, Buildings and Construction and is a part of the Public Protection and Regulation Cabinet. The office administers the Kentucky Standards of Safety which include certain codes and standards of the National Fire Protection Association which are filed as part of the body of standards adopted by reference in their entirety. These standards apply where safety to life or protection of the public interest requires their enforcement. The Fire Marshal's Office administers the State Electrical Certification and Inspection program; the Elevator Safety Inspection program; Mobile Home and Recreational Vehicle Certification and the certification and inspection of boilers, pressure vessels, and pressure piping. The Fire Marshal's Office also contains a state-wide hazardous materials response organization on duty 24 hours a day and radio contact with the State Police. This office acts as the administrative arm of the Commission on Fire Protection Personnel Standards and Education.

Gayle F. Horn
State Fire Marshal
Commonwealth of Kentucky
US #127 S
127 South Bldg.
Frankfort, KY 40601
(502) 564-3626

Louisiana: The Office of State Fire Marshal is responsible for the promulgation and enforcement of rules protecting life and property of the people from the dangers of fire. Five district offices throughout the state are charged with the responsibility of inspecting hospitals, nursing homes, day-care centers, state-owned and state-leased buildings, and penal institutions. This agency is under the Department of Public Safety with all administrative offices located in Baton Rouge. All plans for new construction (over 2 family dwellings), alterations, additions, or renovations of existing structures must be submitted for approval in conformance with the most current NFPA *101, Life Safety Code* and ANSI standards. Upon completion, and before occupancy, final inspections are made by the Fire Marshal deputies. Scheduled meetings for appeals relative to non-conformance submittals are heard before the State Fire Marshal's Board of Review. In March of 1983, the Boiler Inspection Section was transferred from the Department of Labor to the Office of State Fire Marshal. These responsibilities include the inspection and certification of boilers throughout the state; examination and certification of all boiler inspectors; inspections of boilers, pressure vessels and nuclear power plants under construction for compliance with codes. A Boiler and Pressure Vessel Advisory Committee to the Fire Marshal was established to update the Louisiana Boiler Inspection Law and Rules and Regulations. All requests from police or fire departments for investigation of fires considered to be of human design or criminal neglect must be investigated. A special investigation must be conducted in any fire involving more than one human death. This agency participates in the National Fire Incident Reporting System, collecting statistics on fires and related matter, such as origin, life and property loss, conforming with fire incident and fire casualty data collected on a nationwide basis. License fees for fireworks are collected for manufacturers, importers, distributors, and jobbers and the statutes enforced. This agency enforces HUD Title VI Mobile Home Construction and Safety Standards Act and all state governing agencies; supervises inspection of each home manufactured in Louisiana and all units on dealer lots shipped into the state; investigates consumer complaints to determine validity according to Federal Standards; and ascertains that applicable fees are collected for licenses issued each manufacturer within the state, those who ship into the state, and all dealers and salesmen within the state. A Manufactured Housing Board of Review serves under the jurisdiction of the Fire Marshal.

Carrol L. Herring
State Fire Marshal
1033 N. Lobdell Blvd.
Baton Rouge, LA 70806
(504) 925-4911

Maine: The Office of State Fire Marshal was established in 1973 as a bureau of the Department of Public Safety. The fire marshal or his deputies investigate explosions and suspicious fires and inspect public buildings including schools, hospitals, and nursing homes. They also enforce laws and regulations covering arson, fireworks, dance halls, theaters, explosives, LP-Gas, flammable liquids, and other common hazards. Oil burners and solid fuel central heating installations are regulated by the Oil and Solid Fuel Board and electrical installations by the Electricians Examining Board, both under the Department of Business Regulations.

Donald M. Bisset
State Fire Marshal
Maine Dept. of Public Safety
99 Western Ave.
Augusta, ME 04333
(207) 289-2481

In 1775, before the British marched on Bunker Hill in Boston, they set fire to some 400 dwellings across the bay in Charlestown. This was done more as a diversionary tactic than as punishment, but it served both purposes. The general intent of such burnings in this war, and later in the Civil War, was to break down the will of people residing in the area and create concern among the thousands of volunteer soldiers .... to cause them to desert.

Maryland: The Office of the State Fire Marshal is an Agency of the Department of Public Safety and Correctional Services. The marshal is responsible for enforcing regulations which are promulgated by a State Fire Prevention Commission covering life safety in all structures and installations, flammable liquids, LP-Gas, fire protection equipment, and for enforcement of state statutes covering explosives, electrical safety, fireworks, and arson. The State Building Code applies to state properties only. The Division of Labor and Industry enforces safety and health standards for places of employment.

Rocco J. Gabriele
State Fire Marshal
State Office Bldg.
301 W. Preston St.
Baltimore, MD 21201
(301) 383-2520

Massachusetts: The state fire marshal is director of the Division of Fire Prevention which is charged with the enforcement of fire prevention laws, rules, and regulations. This includes the investigation of suspicious fires and explosions and those of undetermined origin, as reported by the local fire authorities. The Division supervises and regulates the transportation, manufacture, storage, and use of explosives and fireworks, and licenses persons engaged in these fields of endeavor and holds hearings arising from appeals from the decisions of local authorities on the storage of flammable and explosive materials. It also maintains statistical reports on fires and explosions and consults with legislators, public officials, fire and police departments, and the general public on fire prevention matters throughout the Commonwealth. It also approves devices in certain categories as specified by law, and also passes on construction of tanks and pipelines.

Joseph A. O'Keefe
State Fire Marshal
Massachusetts Dept. of Public Safety
1010 Commonwealth Ave.
Boston, MA 02215
(617) 566-4500

Michigan: The duties and responsibilities of the state fire marshal are assigned to the Department of State Police as a division of that department. The majority of the work performed by the Fire Marshal Division is in arson and fire investigation, firesafety and fire prevention, fire reporting, hazardous materials transportation and storage inspection and enforcement, providing information and consultation to local authorities and groups upon request, and participating in a variety of training and instruction programs on hazardous materials, fire investigation, and firesafety. Within the division is the State Fire Safety Board which is responsible for promulgating rules addressing firesafety requirements for occupancies such as schools, health care facilities, facilities for the mentally retarded, places of public assembly, adult foster care facilities, penal institutions, and drycleaning establishments using flammable liquids. It also regulates the storage, transportation, and handling of all hazardous materials, and promulgates fire inspector training and certification requirements. A Municipal Fire Service Classification Board within the division recommends criteria for assessing the fire fighting capability of municipal fire departments and for reviewing fire insurance risk classifications. Also within the division is a Firefighters Training Council that establishes advisory fire fighter training standards, approves fire fighters' training schools, provides courses of study to fire fighters, trains instructors, and evaluates fire fighter training schools and courses, and presents instruction. A State Construction Code is administered by a Construction Code

Commission and encompasses the enforcement of the State Electrical Code through a State Electrical Administrative Board. The Chief of the Fire Marshal Division is an ex-officio member of the Commission.

Captain William R. Rucinski
Chief, Fire Marshal Division
Michigan Dept. of State Police
General Office Bldg.
7150 Harris Dr.
Lansing, MI 48913
(517) 322-1924

Minnesota: The State Commissioner of Public Safety is ex-officio state fire marshal and the functions of this office are handled by an appointed state fire marshal. State statutes cover control of arson, exits, places of public assembly, schools, theaters, drycleaning plants, institutions, and fireworks. There are regulations covering nursing homes, petroleum products and LP-Gas products, natural gas and other common fire hazards. The state adopted amended versions of the Uniform Building Code which is administered by the State Building Code Division. The *National Fire Codes*® are enforced by the state fire marshal in conjunction with the Uniform Fire Code.

Wes Werner
State Fire Marshal
Minnesota Dept. of Public Safety
Fire Marshal Division
1246 University Ave.
St. Paul, MN 55104
(612) 296-7643

Mississippi: The State Insurance Commissioner is ex-officio state fire marshal. The fire marshal is responsible for the investigation of incendiary fires and the enforcement of the state-adopted Standard Fire Prevention Code. The LP-Gas regulations are enforced by a division of the State Fire Marshal.

George Dale
Commissioner of Fire Insurance and
State Fire Marshal
State of Mississippi
416 Woolfolk Bldg.
Jackson, MS 39205
(601) 354-6304

Missouri: There is an Office of State Fire Marshal within the Department of Public Safety which investigates only those fires which are arson or which are suspected to be arson. By statute, the agency is a criminal investigation unit dealing with the crime of arson. The fire marshal and his investigators are armed and they have full powers of arrest, search and seizure, and subpoena. There is no state fire code. Local political subdivisions have the authority to enact and enforce fire prevention ordinances under state law. However, fire inspectors from the fire marshal's office inspect premises which are licensed by the State Department of Mental Health and the State Division of Family Services.

James J. Helbig
State Fire Marshal
Missouri Dept. of Public Safety
P.O. Box 844
505 Missouri Blvd.
Jefferson City, MO 65102
(314) 751-2930

Montana: The state fire marshal is under the State Attorney General and is part of the State criminal justice system. The fire marshal is authorized to carry firearms, make arrests, search and seize, to enjoin the use of buildings, and to restrain certain activity until compliance is met. He is authorized by statute to adopt and promulgate firesafety regulations with the advice of the State Fire Prevention Advisory Commission. The fire marshal is responsible for fire protection, fire and arson investigation, explosives, fireworks, flammable liquids, LP-Gas, and a fire reporting system. The State Building Code Director enforces building and electrical codes. Local jurisdictions may adopt and enforce the State Building Codes.

Robert Kelly
State Fire Marshal
State of Montana
Fire Marshal Bureau
303 N. Roberts, Rm. 371
Helena, MT 59620
(406) 449-2050

Nebraska: The state fire marshal enforces laws relating to arson and fire investigation, promotes firesafety, and prepares and enforces regulations covering fire prevention; storage and handling of flammable and combustible liquids; life safety in places of assembly, and educational, institutional, residential, mercantile, office, storage, and industrial occupancies; storage and handling of LP-Gas and other hazardous materials, and the inspection of licensed care facilities. The fire marshal's office delegates to local authorities enforcement of its regulation. NFPA *101, Life Safety Code* is generally the basis for life safety regulations prepared by the fire marshal's office.

Wallace M. Barnett
State Fire Marshal
State Office Bldg.
301 Centennial Mall S, 6th Floor
P.O. Box 94677
Lincoln, NE 68509
(402) 471-2027

Nevada: The Nevada State Fire Marshal Division is in the Department of Commerce. The fire marshal is empowered by statute to promulgate regulations relative to arson, fire prevention, fire extinguishers and systems, sprinkler and alarm systems, flammables, fireworks, explosives, adequacy of exits. He also approves licensing for the safety of patients in all state-licensed health care facilities. He inspects and does plans review and approvals for all state-owned or occupied buildings. He is required by statute to license fire extinguisher service agencies and servicemen, fire alarm and sprinkler system installation and service companies. He licenses and regulates fireworks and explosives. LP-Gas regulations are enforced by the State LP-Gas Board. Tank vehicle regulations are enforced by the Public Service Commission. He is responsible for retrofitting existing buildings. This generally consists of fire alarms, sprinkler systems, and/or interior finish requirements in public assemblies, exiting and emergency lighting, and fire alarms in public and sleeping buildings, and smoke detector placement in sleeping buildings. He is responsible for state fire service training which provides basic training, certification training, and other specialized training to Nevada Fire Departments.

Tom J. Huddleston
State Fire Marshal
Capitol Complex, Kinkead Bldg.
505 E. King St.
Carson City, NV 89710
(702) 885-4290

New Hampshire: The state fire marshal is under the supervision of the Director of Safety Services. The state fire laws cover control of arson, fireworks, exits, construction of buildings, places of public assembly, hospitals, institutions, and nursing homes. There are standards covering flammable liquids, explosives, LP-Gas, and other common hazards.

Stanley J. Emeryt
Acting State Fire Marshal
New Hampshire Dept. of Safety
James H. Hayes Bldg.
Hazen Dr.
Concord, NH 03301
(603) 271-3336

New Jersey: The Office of the State Fire Marshal is organized under the New Jersey Department of Law and Public Safety by Executive Order No. 84. The Office is responsible for the fire protection and inspections of all state-owned, -leased and -occupied buildings. It also oversees fire data collection using the National Fire Incident Reporting System. Arson investigations are conducted by the New Jersey State Police Arson Unit. New Jersey has adopted the B.O.C.A. Basic Building Code, which is administered by the New Jersey Department of Community Affairs, which also regulates multiple dwellings. Fireworks laws are under the jurisdiction of the New Jersey Department of Labor and Industry. LP-Gas installation standards are enforced by the State Police. Forest Fire Service is in the Department of Environmental Protection. Private hospitals, nursing homes and boarding homes are regulated by the New Jersey Department of Health. Motor vehicles are controlled by the Division of Motor Vehicles.

John McQuade
State Fire Marshal
New Jersey Dept. of Law and
Public Safety
State House
Trenton, NJ 08625
(609) 882-2000

New Mexico: The Superintendent of Insurance is also state fire marshal. The Fire Marshal Law covers investigation of fire hazards, fire prevention education in the schools, and training of fire fighters. The fire marshal is also responsible for the investigation of all fires of suspicious origin, and for promulgating rules and regulations relating to life safety in public occupancies. Flammable liquid regulations are enforced by the fire marshal. The electrical code is enforced by the Electrical Administration Board, firesafety in hospitals and institutions by the Contractor's License Board, drycleaning regulations by the Dry Cleaning Board, and LP-Gas firesafety regulations by the LP-Gas Commission. The Fireworks Law is enforced on the local level.

Robert Baca
Deputy State Fire Marshal
State of New Mexico
Office of the Fire Marshal
P.O. Drawer 1269
Sante Fe, NM 87501
(505) 827-2357

New York: The Department of State, Office of Fire Prevention and Control, under the State Fire Administrator, has statutory responsibility to advise, assist and/or coordinate arson suppression, detection, investigation, and prosecution. The office provides fire prevention education and technical assistance activities to all levels of state and local government. Full-time state senior training technicians conduct specialized and advanced training at the local level. On the county level, the office provides a central, statewide data and training records capability, film library, student workbooks, lesson plans, and instructor development programs for state training. The office operates the Academy of Fire Science which conducts on-site programs for all levels of fire service personnel, as well as other public officials and agencies. In addition, the State Fire Administrator administers the mandatory minimum training standards for paid fire fighters.

There is a uniform State Building Code, drafted and revised periodically by a unit of the State Division of Housing and Community Renewal, which local municipalities may adopt and enforce. There is a companion State Fire Prevention Code which may be similarly adopted and enforced on the local level. The State Fire Administrator has final approval of the Fire Prevention Code's contents.

The State Health Department has jurisdiction over transient-type occupancies for firesafety and health codes. The State Labor Department has jurisdiction over firesafety requirements for business and industrial establishments and certain places of public assembly. The transportation of explosives is also controlled, to some degree, by the Labor Department. The State Commissioner of Education has some jurisdiction over public school buildings and to some degree over buildings of private schools licensed by him. The State Commissioners of Health and Mental Hygiene are responsible for firesafety in state hospitals under their respective jurisdictions. The State Commissioner of Social Services is responsible for firesafety in certain institutions which fall within his area of operation. Nursing home and hospital firesafety is the responsibility of the Department of Health. New York has not adopted the Uniform Arson Law but has adopted a State Fireworks Law.

Francis A. McGarry
State Fire Administrator
New York Dept. of State
Office of Fire Prevention and Control
162 Washington Ave.
Albany, NY 12231
(518) 474-6746

North Carolina: The Commissioner of Insurance is the state fire marshal. The use of fireworks is banned except that permission for use of fireworks at public displays may be obtained from the Board of County Commissioners. The Commissioner of Insurance has the responsibility for administration and enforcement of a statewide building code which applies to all types of buildings throughout the state including assemblies, schools, hospitals and institutional buildings. A Deputy Commissioner of Insurance serves as Director of the Division and also serves as secretary to the Statewide Building Code Council. The Department of Insurance is also responsible for regulations for mobile home construction and the Commissioner of Agriculture is responsible for LP-Gas Regulations. The state fire laws cover control of arson and are enforced by the State Bureau of Investigation.

Lee Hauser
Deputy Commissioner
NC Department of Insurance
Box 26387
Raleigh, NC 27611
(919) 733-3901

In 1881, brass poles were introduced in Worcester, Massachusetts, and soon after became standard fire station equipment.

North Dakota: The state fire marshal is head of the Fire Marshal Department, which is organized under the Attorney General. Fire laws cover arson, fireworks, explosives, construction of schools, fire escapes and exits, electrical wiring, and other common hazards. Regulations of the fire marshal cover fire extinguishers, LP-Gas, nursing homes, and hospitals.

John D. Jansen, Jr.
State Fire Marshal
Criminal Identification Bldg.
P.O. Box 1292
Bismark, ND 58501
(701) 224-2434
(800) 472-2600 (in ND)

Ohio: The Division of State Fire Marshal is a part of the Department of Commerce and is headed by the state fire marshal. Within the division are the Arson Bureau, Arson Crime Laboratory Bureau, Fire Prevention Bureau, Inspection Bureau and Hazardous Materials Bureau. In addition, the state fire marshal operates the Ohio Fire Academy. The fire marshal adopts and enforces the Ohio Fire Code, investigates fires and explosions, prosecutes arsonists, compiles fire loss statistics, educates the public in firesafety, licenses hotels, and certifies persons who service, test, repair, or install fire protection equipment. The B.O.C.A. Basic Fire Prevention Code has been adopted as the Ohio Fire Code, except for those portions expressly modified or deleted. The Inspection Bureau inspects or causes to be inspected buildings and other places, except single-family dwellings and units in two-family and multi-family dwellings, for compliance with the Ohio Fire Code. It is particularly concerned with assuring firesafety in hotels, nursing homes, hospitals, schools, and places for public assemblage. Firesafety inspectors must be certified in the State of Ohio. The Division of Factory and Building Inspection, Department of Industrial Relations, enforces the Ohio Basic Building Code.

Norman Sylvester
Acting State Fire Marshal
Department of Commerce
Division of State Fire Marshal
8895 E. Main St.
Reynoldsburg, OH 43068
(614) 864-5510

Oklahoma: The State Fire Marshal Agency is a separate and independent agency in the State Government. A five-member Fire Marshal Commission appoints the state fire marshal and the fire marshal answers directly to the Commission. The Commission is empowered by state statutes to adopt and promulgate rules and regulations related to the general areas of responsibility of the fire marshal. NFPA *National Fire Codes* are adopted by reference, also the B.O.C.A. Basic Building Code. The agency conducts plans review, makes firesafety inspections, including inspection of health care facilities for Medicare and Medicaid approval, and enforces the provisions of NFPA 30, *Flammable and Combustible Liquids Code*. The agency is responsible for fire investigation, including investigations under the State Arson Law. Investigators are certified State Peace Officers.

Jack C. Sanders
State Fire Marshal
State of Oklahoma
4040 N. Lincoln Blvd., Suite 100
Oklahoma City, OK 73105
(405) 424-4371

Oregon: The Office of State Fire Marshal is organized as a division of the Department of Commerce. Fire laws contain provisions covering arson, fire investigation and reporting, exits, places of public assembly, schools, hospitals and institutions including Medicare-Medicaid surveys, storage and handling of flammable and combustible liquids, liquefied petroleum gases, liquefied natural gas, storage and handling of explosives and blasting agents, and all other buildings except private one- and two-family dwellings. Laws provide for rural fire protection districts, mutual aid agreements, and fire fighter training. The *National Electrical Code®* is enforced by the State Building Codes Division of the Department of Commerce. The transportation of flammable liquids is the responsibility of the Public Utilities Commission.

Olin L. Greene
State Fire Marshal
Department of Commerce
Office of State Fire Marshal
103 Labor & Industries Bldg.
Salem, OR 97310
(503) 378-4580

Pennsylvania: The Office of Fire Safety Services within the Pennsylvania Emergency Management Agency is the state focus for fire safety programs and issues, and is comprised of three components: The State Fire Commissioner's Office; the Volunteer Loan Assistance Program; and the State Fire Academy. The State Fire Commissioner directs the Office of Fire Safety Services; serves as the Chairman of the Governor's Interagency Committee on Arson; and is additionally responsible for providing a cost-effective fire loss management system for the Commonwealth of Pennsylvania, and developing scenarios which accurately reflect and strategically attack the fire problem in Pennsylvania to reduce fire deaths, injuries, incidents and related economic loss. In other agencies, the State Police Fire Marshal is responsible for the investigation of fires and arson; enforcing regulations for flammable liquids and for fireworks; and removing certain fire hazards. There is a Fireworks Law as well as an Arson Law. The Department of Labor and Industry, through its Bureau of Occupational and Industrial Safety, is charged with the enforcement of building regulations for protection from fire and panic; comprehensive regulations are issued. The Department of Transportation, through its Hazardous Substances Transportation Board, issues regulations covering the transportation of hazardous substances over state highways.

Charles A. Henry
State Fire Commissioner Office of Fire Safety Services
Pennsylvania Emergency Management Agency
B-118 Transportation/Safety Building
Harrisburg, PA 17120
(717) 783-8150

Rhode Island: The Office of State Fire Marshal operates within the Division of Firesafety which is part of the State Executive Department. The state fire laws contain provisions covering control of arson, fireworks, exits, places of public assembly, schools, hospitals, institutions, theaters, and garages. There are regulations covering flammable liquids, LP-Gas, and other common fire hazards. The fire marshal's office enforces the firesafety laws, promulgates and enforces regulations, investigates arson and conducts firesafety inspections of buildings.

Earl F. Shannon
State Fire Marshal
Rhode Island Division of Fire Safety
1270 Mineral Spring Ave.
North Providence, RI 02904
(401) 277-2335

South Carolina: The Division of State Fire Marshal functions within the Budget and Control Board under the office of Executive Director. The fire marshal is appointed by the Budget and Control Board. Rules and regulations covering common hazards are formulated by the State Fire Commission. LP-Gas and anhydrous ammonia are also controlled within the Division of State Fire Marshal under the direction of a duly established Licensing Board. Hospital and nursing home facilities are inspected and licensed by the State Department of Health and Environmental Control. Arson Laws are enforced by the South Carolina Law Enforcement Division.

Richard S. Campbell
State Fire Marshal
Division of State Fire Marshal
Budget and Control Board
1109 Belleview St.
Columbia, SC 29201
(803) 758-2941

South Dakota: The state fire marshal operates within the Department of Public Safety. The fire marshal's powers include investigation of fire and arson, annual inspection of schools, inspection of state-owned buildings, LP-Gas bulk plants and flammable liquids plants, regulation of explosives, licensing of the sale or issuance of fireworks, and administration of pipeline safety and boiler safety programs. The state has adopted NFPA *101, Life Safety Code*, and the fire marshal's office maintains a statewide fire reporting system.

Jim Flippin
State Fire Marshal
South Dakota Dept. of Public Safety
118 West Capitol
Pierre, SD 57501
(605) 773-3562

Tennessee: The Division of Fire Prevention, also known as the State Fire Marshal's Office, is administered through the director for the Commissioner of Insurance, State of Tennessee. The laws and regulations enforced by the State Fire Marshal's Office cover arson and fraud as related to arson, LP-Gas explosives and other common hazardous materials, the mobile home industry (both manufacturers and dealers) and the licensing and registration of all educational facilities, and review of construction drawings on related buildings. The Electrical Inspection Section inspects all electrical installations in the state. The State Fire Marshal's Office investigates all fire deaths and runs a state-wide fire incident reporting system.

R. T. Johnson
State Fire Marshal
Tennessee Department of Insurance
Division of Fire Prevention
410 Tennessee Bldg.
Nashville, TN 37219
(615) 741-2981

Texas: The State Board of Insurance appoints the state fire marshal, who enforces regulations covering the control of arson, exits, flammable liquids, fire extinguishers and systems, fire alarm systems, sprinkler systems, fireworks, and other common fire hazards. The *National Fire Codes* are utilized by the State Fire Marshal as recommended standards of good practice. The State Fire Marshal manages and supervises the National Fire Incident Reporting System (NFIRS) program for the State of Texas. The control of liquefied petroleum (LP-) gas, as well as natural gas, is the responsibility of the Railroad Commission of Texas. Fire protection guidelines for hospitals and nursing homes are created by the State Department of Health. The Department of Public Safety regulates the transportation of explosives and irradiated materials over Texas highways. Mobile home regulations are adopted and enforced by the Manufactured Housing Division of the Texas Department of Labor and Standards.

Ernest A. Emerson
State Fire Marshal
State Board of Insurance
1110 San Jacinto
Austin, TX 78786
(512) 475-4203

Utah: An appointed State Fire Prevention Board oversees the activities of the State Fire Marshal's Office, which is a separate agency reporting directly to the governor. The Board has authority to adopt rules and regulations pertaining to firesafety and life safety in all public assembly, educational, institutional, and state-owned occupancies. The fire marshal has code-enforcing authority in all public schools and state-owned buildings throughout the state, and all occupancies listed above in unincorporated areas. The fire marshal also assumes responsibility for the investigation of suspicious fires statewide. The Fire Prevention Board is also responsible for drafting for recommendation to political subdivisions throughout the state, codes and regulations relating to firesafety and life safety in all buildings, and in the use of handling of chemical, gaseous, explosive, radioactive, and other hazardous substances. State laws, rules and regulations have been adopted pertaining to fire extinguisher servicing, fireworks, explosives, arson, and foamed plastic insulation.

Steve M. Kennedy
State Fire Marshal
Utah Department of Public Safety
4501 South - 2700 W
Salt Lake City, UT 84119
(801) 965-4353

Vermont: The Office of State Fire Marshal is part of the Bureau of Criminal Investigation of the Vermont State Police. The fire marshal investigates arson and other fires to determine cause. The firesafety codes are mostly NFPA standards and are enforced by the Fire Prevention Division of the Department of Labor and Industry. Regulations cover fire alarm systems, nursing homes, heating equipment, exits, LP-Gas, chimneys, flammable liquids, and other fire hazards.

Paul R. Philbrook
Commissioner of Public Safety and
State Fire Marshal
State of Vermont
State St.
Montpelier, VT 05602
(802) 828-2144

Virginia: The Office of State Fire Marshal is located in the Division of Building Regulatory Services within the Department of Housing and Community Development. The laws cover safety to life and property in public buildings (buildings occupied by 10 or more people except one-, two- and three-family dwellings). The fire marshal also investigates complaints of flammable or combustible conditions and has authority to require such alterations as he may deem necessary to abate the hazard.

Howard H. Summers, Jr.
Chief Fire Marshal
Office of the State Fire Marshal

Virginia Department of Housing and
Community Development
205 N. Fourth St.
Richmond, VA 23219
(804) 786-4751

Washington: The State Insurance Commissioner is ex-officio state fire marshal. The fire marshal is responsible for enforcing state laws and regulations concerning arson and fireworks. He is also responsible for firesafety and life safety in hospitals, nursing homes and boarding homes, transient accommodations, private establishments, and child-care facilities. The state fire marshal administers the State Fire Reporting Law (state counterpart of NFIRS) and issues an annual report and firesafety information to the fire service and general public. The state fire marshal also aids in the enforcement of local fire codes. There is a state building code enforced by each city, town, and county. The Department of Labor and Industries regulates LP-Gas, electrical installations, and explosives storage and handling. The state patrol regulates transportation of explosives.

Thomas R. Brace
Director, Division of State Fire Marshal
State of Washington
Insurance Bldg., Room 140
Olympia, WA 98504
(206) 753-3605

West Virginia: The state fire marshal is appointed in accordance with the qualifications approved by the State Civil Service Commission by the State Fire Commission and is under the direction of the State Fire Commission. The state fire marshal shall enforce all laws of the state having to do with: prevention of fire; the storage, sale, and use of any explosive, combustible, or other dangerous article in solid, flammable liquid or gas form; the installation and maintenance of equipment of all sorts intended to extinguish, detect, and control fires; the means and adequacy of exits from buildings, and the suppression of arson. The state fire marshal enforces the state fire code throughout the state as promulgated by the State Fire Commission. The State Fire Code has adopted the *National Fire Codes*. Licensing of electricians is the responsibility of the state fire marshal. Jurisdiction of state fire marshal covers all occupancies except one- and two-family dwellings in regard to State Fire Code requirements.

Walter Smittle III
State Fire Marshal
State of West Virginia
2000 Quarrier St.
Charleston, WV 25305
(304) 348-2191

Wisconsin: The Arson Bureau is in the Department of Justice. The administrator of the Division of Criminal Investigation is the state fire marshal. Duties and functions of the office are carried out by the director of the Arson Bureau. The principle duty of the state fire marshal is the investigation of arson fires and criminal explosions. There is an Arson Law. Fire prevention laws and regulations are administered by the Fire Prevention Division of the Department of Industry, Labor, and Human Relations, which has jurisdiction over public buildings, schools, hospitals, factories, stores, apartments, etc. There is a Fireworks Law, a State Building Code, and a Heating and Ventilating Code.

Philip C. Culp
Director, Arson Bureau
123 W. Washington Ave., Room 415
Madison, WI 53702
(608) 266-1671

Wyoming: The state fire marshal is appointed by the governor and directs the Department of Fire Prevention and Electrical Safety. The fire marshal appoints the head of the Fire Prevention Division and the Electrical Safety Division. The duties of the fire marshal include inspecting public, business, and industrial buildings; enforcing the arson laws; condemning unsafe buildings; overseeing the licensing of electricians; and reviewing construction plans for compliance with the building codes and fire codes and the Public Handicapped Law. Fireworks laws are enforced by local authorities.

Billy M. Weckwerth
State Fire Marshal
Department of Fire Prevention and
Electrical Safety
720 W. 18th St.
Cheyenne, WY 82002
(307) 777-7288

State Forest Fire Supervisors

Alabama
Richard Cumbie, Director
Forest Rescue Protection Division
Alabama Forestry Commission
513 Madison Ave.
Montgomery 36104
(205) 832-6587

Alaska
Elmer Hurd
Fire Management Forester
Division of Forestry
555 Cordova St., Pouch 7-005
Anchorage 99510
(907) 276-2653

Arizona
David Behrens, Fire Management Officer
Protection Section
State Land Dept.
1524 W. Adams
Phoenix 85007
(602) 271-4059

Arkansas
Warren Smith
Protection Forester
Arkansas Forestry Commission
P.O. Box 4523, Asher Station
Little Rock 72214
(501) 371-1734

California
Gerald A. Letson
Chief of Fire Protection
Dept. of Forestry
Resources Agency
1416 Ninth St.
Sacramento 95814
(916) 445-9882

Colorado
Ron Zeleny
Staff Forester
Fire Protection
Colorado State Forest Service
Colorado State University
Fort Collins 80523
(303) 482-8185
(303) 491-6303

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Fire Statistics

Highlights of 1982 U.S. Fire Experience*

- 6,020 civilians died as a result of fires in the United States in 1982, a significant decrease of 680, or 10.1 percent from 1981.
- 4,940 of the civilian fire deaths occurred as a result of residential fires in 1982, a decrease of 10.8 percent from 1981; residential fires accounted for 82.0 percent of all civilian fire deaths in 1982.
- 3,960 of the civilian fire deaths occurred in one- and two-family dwellings, a decrease of 10.6 percent from 1981; 860 civilians died in apartment fires, a decrease of 11.3 percent from 1981.
- 910 civilian fire deaths, 17.5 percent of total fire deaths in structures, occurred as a result of incendiary or suspicious fires, an increase of 11.0 percent from 1981. There were 129,000 incendiary or suspicious fires in structures, a decrease of 16.5 percent from 1981. These fires caused property loss of $1,604,000,000, a decrease of 3.3 percent from 1981.
- 117 fire fighters died in the line of duty in 1982, a decrease of 4.9 percent from 1981.
- 30,525 civilians were injured in fires in the United States during 1982, a slight increase of 0.3 percent from 1981. This estimate for civilian injuries is on the low side, due to underreporting of civilian injuries to the fire service.
- 99,300 fire fighter injuries occurred in the line of duty, a decrease of 3.9 percent from 1981.
- 2,538,000 fires were attended by fire departments, a significant decrease of 12.3 percent from 1981.
- There was an estimated $6,432,000,000 in property damage from fire in the United States during 1982, a decrease of 3.7 percent from 1981. However, average loss per fire was $2,534, an increase of 9.8 percent from 1981.
- 946,500 fires occurred in structures, a decrease of 7.9 percent from 1981.
- An estimated $5,731,000,000 in property damage occurred in structure fires, a decrease of 4.1 percent from 1981.
- There was an estimated 32,250 fires in mobile homes, resulting in 520 civilian deaths, and $185,000,000 in property loss.
- The largest communities (population of 500,000 or more), and the smallest communities (under 2,500 population) had the highest fire incident rates; while communities with populations of 250,000 or more and communities with populations of 24,999 or less had the highest fire death rates.
- The Northeast and South generally experienced higher fire incident rates and higher fire death rates than other regions.

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*Michael J. Karter Jr., "Fire Loss in the United States - 1982," *Fire Journal*, Vol. 77, No. 5 (September 1983). The 1982 NFPA National Fire Experience Survey was supported in part through the funding of a data exchange agreement between the NFPA and the United States Fire Administration of the Federal Emergency Management Agency. This continuing cooperative effort is in the interest of better understanding and alleviating the fire problem in the United States and is greatly appreciated by the Association.

The agony of losing a home to fire . . . this home was destroyed as the owner and his wife stood by helplessly. It took fire fighters almost two hours to bring the smoky two-alarm blaze under control. The fire was discovered by the owners when they returned from shopping to find their home in flames. (John Hartman, *Lawrence Eagle-Tribune*)

Other Fire Department Responses

In addition to fires, fire departments responded to the following estimated type and number of incidents in 1982:

Medical aid responses (ambulance, EMT, rescue)	5,258,000
False alarm responses	853,500
Mutual aid or assistance responses	346,500
All other responses (service calls, arcing wires, washdowns, etc.)	1,552,000
Total Nonfire Incidents:	8,010,000

WE WANT TO KNOW . . .
if a name, an address, or a phone number has changed; if there's an upcoming event, a new program or course, a new publication being offered. If you have more current information than is contained in this *Almanac*, know something that should be included in this book, or just have something interesting about the fire protection scene that you want to contribute, please let us know. Write: Editor, *Fire Almanac*, NFPA, Batterymarch Park, Quincy, MA 02269. All suggestions will receive our careful attention.

ESTIMATES OF 1982 UNITED STATES CIVILIAN FIRE DEATHS AND INJURIES FOR SELECTED PROPERTY USE CATEGORIES

	Civilian Deaths			Civilian Injuries		
Property Use	Estimate	Change from 1981	% of all Civilian Deaths	Estimate	Change from 1981	% of all Civilian Injuries
Residential (total)	4,940	-10.8%	82.0%	21,100	+ 3.6%	69.1%
One- and Two-Family Dwellings[1]	3,960	-10.6%	65.7%	15,750	+ 5.9%	51.6%
Apartments	860	-11.3%	14.3%	4,700	+10.6%	15.4%
Hotels and Motels	75	-16.7%	1.3%	450	-47.1%‡	1.4%
Other Residential	45	-10.0%	.7%	200	-50.0%	.7%
Non-Residential Structures[2]	260	+18.2%	4.3%	4,475	-16.0%	14.7%
Highway Vehicles	575	-25.3%	9.6%	3,250	+12.1%	10.6%
Other Vehicles[3]	120	+71.4%	2.0%	175	-65.0%‡	.6%
All Other[4]	125	+25.0%	2.1%	1,525	+13.0%	5.0%
Total	6,020	-10.1%†		30,525	+ .3%	

Estimates are based on data reported to the NFPA by fire departments that responded to the 1982 National Fire Experience Survey.

[1] Includes mobile homes.

[2] Includes public assembly, educational, institutional, stores and offices, industry, utility, storage, and special structure properties.

[3] Includes trains, boats, ships, aircraft, farm vehicles, and construction vehicles.

[4] Includes outdoor properties with value, brush, rubbish, and other.

†Change was statistically significant at the .05 level.

‡Change was statistically significant at the .01 level.

ESTIMATES OF 1982 UNITED STATES FIRE AND PROPERTY LOSS BY TYPE OF FIRE

	Number of Fires		Property Loss[1]	
Type of Fire	Estimate	Change from 1981	Estimate	Change from 1981
Fires in Structures	946,500	- 7.9%‡	$5,731,000,000	- 4.1%
Fires Outside of Structures with value involved but no vehicle (outside storage, crops, timber, etc.)	54,000	-33.3%‡	52,000,000	-14.8%
Fires in Highway Vehicles	433,000	- 4.4%†	525,000,000	+ 5.0%+
Fires in Other Vehicles[2]	10,000	-25.9%‡	66,000,000	-29.8%
Fires in Brush, Grass Wildland (excluding crops and timber), with no value or loss involved	522,500	-26.5%‡	—	—
Fires in Rubbish including dumpsters (outside of structures), with no value or loss involved	309,500	- 9.2%†	—	—
All Other Fires	262,500	- 1.5%	58,000,000	+28.9%
Total	2,538,000	-12.3%‡	$6,432,000,000	- 3.7%

The estimates are based primarily on data reported to the NFPA by fire departments that responded to the 1982 National Fire Experience survey.

[1] Includes overall direct property loss and loss to contents, structure, a vehicle, machinery, vegetation, or anything else involved in a fire and does not include indirect losses, e.g., business interruption or temporary shelter costs; no adjustment was made for inflation in the year to year comparison.

[2] Includes trains, boats, ships, aircraft, farm vehicles, and construction vehicles.

†Change was statistically significant at the .05 level.

‡Change was statistically significant at the .01 level.

ESTIMATES OF 1982 UNITED STATES STRUCTURE FIRES AND PROPERTY LOSS BY PROPERTY USE

	Structure Fires		Property Loss[1]	
Property Use	Estimate	Change from 1981	Estimate	Change from 1981
Public Assembly	28,000	- 1.8%	$381,000,000	+ 7.0%
Educational	16,500	5.4%‡	161,000,000	-12.5%
Institutional	29,600	+ 9.3%	17,000,000	-55.3%‡
Residential (Total)	676,500	- 7.7%‡	3,253,000,000	+ 0.2%
One- and Two-Family Dwellings[2]	538,000	- 6.2%	2,794,000,000	+ 1.9%
Apartments	116,500	-15.0%	353,000,000	-14.9%
Hotels and Motels	10,500	- 8.7%	84,000,000	-15.2%
Other	11,500	+ 9.5%	22,000,000	-31.2%†
Stores and Offices	56,000	-14.5%‡	510,000,000	-20.6%
Industry, Utility, Defense[3]	42,000	-14.3%	663,000,000	-14.5%†
Storage in Structures[3]	54,000	-12.9%‡	584,000,000	- 5.2%
Special Structures	44,000	+ 2.3%	162,000,000	+52.8%
Total	946,500	- 7.9%‡	$5,731,000,000	- 4.1%†

The estimates are based primarily on data reported to the NFPA by fire departments that responded to the 1982 National Fire Experience Survey.

[1] Includes overall direct property loss — loss to contents, structure, a vehicle, machinery, vegetation, or anything else involved in a fire, and does not include indirect losses, e.g., business interruption or temporary shelter costs; no adjustment was made for inflation in the year to year comparison.

[2] Includes mobile homes.

[3] Since some incidents for these property uses were handled only by private fire brigades or fixed suppression systems and were not reported to the NFPA, the results represent only a portion of U.S. Fire Experience.

†Change was statistically significant at the .05 level.
‡Change was statistically significant at the .01 level.

ESTIMATES OF 1982 UNITED STATES FIRES, DEATHS, AND DIRECT PROPERTY LOSS FOR INCENDIARY AND SUSPICIOUS FIRES IN STRUCTURES

	Number of Fires		Number of Civilian Deaths		Direct Property Loss[1]	
Type of Fire	Estimate	Change from 1981	Estimate	Change from 1981	Estimate	Change from 1981
Structure Fires of Incendiary Origin	77,500	-11.9%‡	720	+29.7	$1,088,000,000	- 4.7%
Structure Fires of Suspicious Origin	51,500	-22.6%‡	190	-28.3%	$516,000,000	0.0%
Total Structure Fires of Incendiary and Suspicious Origin	129,500	-16.5%‡	910	+11.0%	$1,604,000,000	- 3.3%

The estimates are based on data reported to the NFPA by fire departments that responded to the 1982 National Fire Experience Survey.

[1] Includes overall direct property loss — loss to contents, structure, a vehicle, machinery, vegetation, or anything else involved in a fire, and does not include indirect losses, e.g., business interruption or temporary shelter costs; no adjustment was made for inflation in the year to year comparison.
‡Change was statistically significant at the .01 level.

NUMBER OF FIRES PER THOUSAND POPULATION (1982) OVERALL AND REGION OF THE COUNTRY BY POPULATION OF COMMUNITY

	Overall	Region			
Population of Community		Northeast	Northcentral	South	West
500,000 or more	11.73	15.51	14.30	11.81	7.65
250,000 to 499,999	10.56	15.23	11.59	9.87	9.26
100,000 to 249,999	10.06	19.48	8.42	9.38	7.82
50,000 to 99,999	9.61	15.81	7.90	10.48	7.06
25,000 to 49,999	9.94	16.45	8.22	10.64	7.19
10,000 to 24,999	10.10	11.63	8.20	12.45	8.97
5,000 to 9,999	11.20	10.43	8.46	15.06	12.08
2,500 to 4,999	11.00	12.06	8.43	13.72	11.91
under 2,500	13.88	15.41	10.58	19.14	15.08

Source: NFPA's Survey of Fire Departments for 1982 U.S. Fire Experience.

NUMBER OF CIVILIAN DEATHS PER MILLION POPULATION (1982) OVERALL AND REGION OF THE COUNTRY BY POPULATION OF COMMUNITY

	Overall	Region			
Population of Community		Northeast	Northcentral	South	West
500,000 or more	30.30	34.58	38.05	29.07	18.69
250,000 to 499,999	28.79	58.33	25.66	24.81	25.72
100,000 to 249,999	22.07	33.08	28.00	25.37	11.51
50,000 to 99,999	19.31	22.07	18.22	24.99	13.89
25,000 to 49,999	17.20	23.23	14.94	23.31	8.91
10,000 to 24,999	24.35	24.36	18.41	38.59	15.36
5,000 to 9,999	26.34	18.75	26.22	35.69	23.88
2,500 to 4,999	30.24	17.28	24.69	45.24	48.27
under 2,500	36.54	20.87	33.38	65.74	34.81

Source: NFPA's Survey of Fire Departments for 1982 U.S. Fire Experience.

AVERAGE 1982 FIRE EXPERIENCE BY POPULATION OF COMMUNITY

Population of Community*	All Fires	Structure Fires	Civilian Deaths	Civilian Injuries	Property Loss
1,000,000 or more	25,855	6,113	101.83	205.76	—
500,000 to 999,999	7,584	2,875	17.31	107.35	$13,039,100
250,000 to 499,999	3,801	1,235	10.29	50.83	8,971,500
100,000 to 249,999	1,433	512	3.15	21.86	2,629,600
50,000 to 99,999	631	217	1.26	20.14	1,322,000
25,000 to 49,999	336	128	.58	4.23	686,700
10,000 to 24,999	156	65	.38	1.81	351,300
5,000 to 9,999	76	32	.18	.72	221,500
2,500 to 4,999	37	15	.10	.49	140,400
under 2,500	16	6	.04	.21	60,500

Source: NFPA's Survey of Fire Departments for U.S. Fire Experience (1982).

*There was insufficient data for communities reporting in the 1,000,000 or more category.

Multiple-Death Fires

A very small number of fires, those that kill three or more people (multiple-death fires), are probably the most devastating of the millions of fires that occur each year. During the five-year period from 1978 to 1982, there were 1,450 multiple-death fires with 5,893 associated deaths reported to the NFPA (see table).[1] Included in the 1,450 fires is one of the most serious fires in recent U.S. fire history, the MGM Grand Hotel fire in November 1980. Although this fire and other major loss of life fires receive worldwide media attention and shock the nation, a multiple-death fire of any size usually has a significant impact on a community or region.

One factor that increases the impact of multiple-death fires is that the majority of them occur in homes or other residential properties. From 1978 to 1982, almost 90 percent of the multiple-death fires reported and 85 percent of the associated deaths were in residential properties.

The NFPA has collected information, studied, and reported on multiple-death fires for many years, due to their significant contribution to the United States fire problem. In 1982 for example, multiple-death fires accounted for only .01 percent of an estimated 2,538,000 fires, but 18.0 percent of the 6,020 estimated fire deaths.[2] A reduction in the number of multiple-death fires occurring each year in the United States could have a significant impact on the number of people who annually lose their lives in fires.

Multiple-Death Fires, 1978-1982

Year	Number of Multiple-Death Fires	Number of Deaths in Multiple-Death Fires	Fires Causing 10 or More Deaths	Deaths in Fires Killing 10 or More
1982	259	1,083	7	116
1981	295	1,186	7	110
1980	326	1,351*	6	168*
1979	282	1,120	9	145
1978	288	1,153	7	95

*Includes 85 deaths in the MGM Grand Hotel fire

Note: The information presented in this Table for 1978 to 1981 differs from previously published statistics due to the updating of NFPA data files as additional information becomes available.

Effects of Major Loss of Life Fires 1900-1981

Historically, fires resulting in a major loss of life have resulted in important changes in building and fire codes and standard fire protection or prevention practices.[3,4] In the early 1900s four building fires, the Rhoades Opera House (1903), the Iroquois Theater (1903), the Lakeview Grammar School (1908), and the Triangle Shirtwaist Factory (1911) were largely responsible for the appointment of the NFPA's Committee on Safety to Life in 1913. The chapter "Origin and Development of *101*" in the current *Life Safety Code* (NFPA *101*) states: "For the first few years of its existence, the committee devoted its attention to a study of the notable fires involving loss of life and in analyzing the causes of this loss of life. This work led to the preparation of standards for the construction of stairways, fire escapes, etc., for fire drills in various occupancies and for the construction and arrangement of exit facilities for factories, schools, etc., which form the basis of the present *Code*."[5]

SELECTED FIRES CAUSING LARGE LOSS OF LIFE — 1900-1983
(10 or more deaths)

Date	Location	Number of Deaths
	PUBLIC ASSEMBLY	
Jan. 12, 1903	Rhoades Opera House, Boyertown, PA	170
Dec. 30, 1903	Iroquois Theater, Chicago, IL	602
Nov. 22, 1919	Dance Hall, Ville Platte, LA	25
Apr. 23, 1940	Rhythm Club, Natchez, MS	207
Nov. 28, 1942	Cocoanut Grove (night club), Boston, MA	492
July 6, 1944	The Ringling Brothers and Barnum and Bailey Circus, Hartford, CT	168
Jan. 29, 1956	Amusement Hall, Arundel Park, MD	11
Oct. 10, 1963	Indiana State Fairgrounds Coliseum, Indianapolis, IN	74
Feb. 7. 1967	Dale's Penthouse (restaurant), Montgomery, AL	25
June 24, 1973	The Upstairs Lounge, New Orleans, LA	32
June 30, 1974	Gulliver's Discotheque, Port Chester, NY	34
Dec. 29, 1975	Airport Terminal building, Brooklyn, NY (bomb explosion)	13
Oct. 24, 1976	The Puerto Rican Social Club, Bronx, NY	25
May 28, 1977	Beverly Hills Supper Club, Southgate, KY	165
Dec. 4, 1980	Conference Center in Stouffer's Inn, Harrison, NY	26
	EDUCATIONAL	
Mar. 4, 1908	Lakeview Grammar School, Collinwood, OH	175
Oct. 28, 1915	St. John's Parochial School, Peabody, MA	22
May 17, 1923	Cleveland School, Beulah, SC	77
Dec. 24, 1924	Babbs Switch School, Hobart, OK	36
Mar. 18, 1937	Consolidated School, New London, TX (gas explosion)	294
Mar. 31, 1954	Cleveland Hill School, Cheektowaga, NY	15
Dec. 1, 1958	Our Lady of the Angels Grade School, Chicago, IL	95
	INSTITUTIONAL	
May 15, 1929	Cleveland Clinic, Cleveland, OH	125
Apr. 21, 1930	Ohio State Penitentiary, Columbus, OH	320
Apr. 4, 1949	St. Anthony Hospital, Effingham, IL	74
Jan. 7, 1950	Mercy Hospital, Davenport, IA	41
Dec. 8, 1961	Hartford Hospital, Hartford, CT	16
Nov. 23, 1963	Golden Age Nursing Home, Fitchville Township, OH	63
Jan. 9, 1970	Convalescent Home, Marietta, OH	32
Jan. 14, 1971	Nursing Home, Buechel, KY	10
Oct. 19, 1971	Nursing Home, Honesdale, PA	15
June 9, 1975	Jail fire, Sanford, FL	11
Jan. 30, 1976	Nursing Home, Chicago, IL	24
June 26, 1977	County Jail, Columbia, TN	42
Dec. 9, 1978	Institution for Mentally Retarded, Ellisville, MS	15
Dec. 27, 1979	County jail, Lancaster, SC	11
Nov. 8, 1982	Jail fire, Biloxi, MS	29
	RESIDENTIAL	
	Apartments	
June 3, 1969	Apartment House, Kansas City, MO	12
Aug. 5, 1970	Apartment Building, Minneapolis, MN	12
Apr. 25, 1971	Apartment Building, Seattle, WA	12
Nov. 30, 1972	High Rise Housing for the Elderly, Atlanta, GA	10
Nov. 15, 1973	Apartment House, Los Angeles, CA	25
Dec. 12, 1975	Apartment Building, San Francisco, CA	14
Feb. 4, 1976	Tenement house, New York, NY	10

SELECTED FIRES CAUSING LARGE LOSS OF LIFE — 1900-1983
(10 or more deaths)

Date	Location	Number of Deaths
Dec. 20, 1976	Apartment house, Los Angeles, CA	10
Dec. 23, 1976	Apartment house, Chicago, IL	12
Dec. 7, 1978	Apartment House, Newark, NJ	12
Jan. 20, 1979	Tenement, Hoboken, NJ	21
Oct. 28, 1980	Apartment House, Chicago, IL	10
Dec. 18, 1980	Apartment House, Salt Lake City, UT	12
Oct. 24, 1981	Apartment House, Hoboken, NJ	11
July 5, 1982	Apartment House, Waterbury, CT	14
	Dwellings	
June 8, 1969	Dwelling, Parkersburg, WV	12
Jan. 11, 1981	Dwelling, East St. Louis, IL	11
May 14, 1982	Dwelling, Baltimore, MD	10
	Other Residential	
Dec. 13, 1977	Dormitory, Providence College, Providence, RI	10
	HOTELS	
	The hotel category includes residential (home) hotels in addition to hotels usually frequented by the traveling public.	
June 5, 1946	The LaSalle Hotel, Chicago, IL	61
Dec. 7, 1946	Winecoff Hotel, Atlanta, GA	119
June 9, 1946	Canfield Hotel, Dubuque, IA	19
Dec. 29, 1963	Roosevelt Hotel, Jacksonville, FL	22
Mar. 20, 1970	Ozark Hotel, Seattle, WA	20
Sept. 13, 1970	Ponet Square Hotel, Los Angeles, CA	19
Dec. 20, 1970	Pioneer Hotel, Tucson, AZ	28
Jan. 16, 1972	Pennsylvania House Hotel, Tyrone, PA	12
Aug. 25, 1974	Washington House Hotel, Berkeley Springs, WV	12
July 7, 1975	Pomona Hotel, Portland, OR	11
Jan. 10, 1976	Pathfinder Hotel, Fremont, NE	20
Jan. 28, 1977	Stratford Hotel, Breckenridge, NM	17
Dec. 10, 1977	Resort Hotel, Bay City, MI	10
Jan. 28, 1978	Coates House Hotel, Kansas City, MO	20
Nov. 5, 1978	Allen Motor Inn, Honesdale, PA	12
Nov. 26, 1978	Holiday Inn, Greece, NY	10
July 31, 1979	Holiday Inn, Cambridge, OH	10
Nov. 21, 1980	MGM Grand Hotel, Las Vegas, NV	85
Mar. 14, 1981	Royal Beach Hotel, Chicago, IL	19
Mar. 6, 1982	Westchase Hilton Hotel, Houston, TX	12
Apr. 30, 1982	Pinter's Home Hotel, Hoboken, NJ	13
Sept. 4, 1982	Dorothy Mae Hotel, Los Angeles, CA	24
	BOARDING FACILITIES/HALFWAY HOUSES	
Apr. 1, 1979	Boarding Home, Connellsville, PA	10
Apr. 2, 1979	Boarding Home, Farmington, MO	25
Apr. 11, 1979	Halfway House, Washington, DC	10
Nov. 11, 1979	Boarding Home, Pioneer, OH	14
July 26, 1980	Boarding Home, Bradley Beach, NJ	24
Jan. 9, 1981	Boarding Facility, Keansburg, NJ	31

Date	Location	Number of Deaths
	STORE AND OFFICE	
July 28, 1945	Empire State Building, New York, NY	14
Aug. 10, 1955	Dairy Store, Andover, OH	22
Nov. 17, 1966	Mercantile Building, New York, NY	12
Apr. 5, 1968	Marting Arms (sporting goods store), Richmond, IN	41
Feb. 25, 1969	Office Building, New York, NY	11
Sept. 24, 1972	Ice Cream Parlor, Sacramento, CA	22
Feb. 2, 1973	Department Store, Eagle Grove, IA (natural gas explosion)	14
Dec. 22, 1976	Department Store, Brooklyn, NY	12
Nov. 5, 197[illegible]	Department Store, Des Moines, IA	10
	BASIC INDUSTRY, UTILITY, DEFENSE	
Mar. 25, 1947	Centralia Coal Co., Centralia, IL	111
Dec. 21, 1951	C.W. & F. Coal Company, W. Frankfort, IL	119
Aug. 9, 1965	Missile Silo, Near Searcy, AR	53
Dec. 30, 1970	Coal Mine Explosion, Hyden, KY	38
May 2, 1972	Silver Mine, Kellogg, ID	91
Mar. 9 & 11, 1976	Coal Mine Explosion, Oven Fork, KY (two blasts)	26
Dec. 8, 1981	Coal Mine, Whitwell, TN	13
	MANUFACTURING	
Nov. 26, 1910	Factory Building, Newark, NJ	25
Dec. 22, 1910	Nelson Morris Co., Chicago, IL	21
Mar. 25, 1911	Triangle Shirtwaist Co., New York, NY	145
July 22, 1913	Binghamton Clothing Co., Binghamton, NY	35
April 10, 1917	Eddystone Ammunition Corp., Eddystone, PA (explosion)	133
July 29, 1956	Refinery, Sun Ray, TX	19
Jan. 24, 1957	Clothing Factory, New Haven, CT	15
Mar. 19, 1958	Clothing Factory, New York, NY	24
Oct. 4, 1960	Aniline mfg Plant, Kingsport, TN	15
Jan. 2, 1963	Meat Processing Plant, Terre Haute, IN	16
Aug. 25, 1965	Synthetic Rubber mfg, Louisville, KY	12
Feb. 3, 1971	Chemical Plant, Woodbine, GA (violent explosion and fire)	25
Dec. 16, 1972	Steel Plant, Weirton, WV (gas explosion in a coke oven)	21
Aug. 12, 1976	Oil Refinery Explosion, Chalmette, LA	12
July 24, 1980	Metal Products mfg, New York, NY	11
	STORAGE	
July 17, 1944	Munitions Depot, Port Chicago, CA (explosion)	300
Oct. 20, 1944	East Ohio Gas Co., Cleveland, OH (gas explosion)	136
May 19, 1950	Pier (R.R.) South Amboy, NJ	31
Dec. 22, 1977	Grain Elevator Explosion, Westwego, LA	36
Dec. 27, 1977	Grain Elevator Explosion, Galveston, TX	18
	SPECIAL	
	Under Construction/Unoccupied	
June 24, 1971	Water Project, Sylmar, CA	17
Dec. 11, 1971	Water Tunnel, Port Huron, MI	22
Feb. 10, 1973	LNG Storage Tank, Staten Island, NY	40
	Outdoor Properties	
Oct. 12, 1918	Forest Fire, Minnesota	559
Oct. 3, 1933	Forest Fire, Los Angeles, CA	28
Oct. 23, 1947	Forest Fire, Maine	15

SELECTED FIRES CAUSING LARGE LOSS OF LIFE — 1900-1983
(10 or more deaths)

Date	Location	Number of Deaths
Aug. 7, 1948	Forest Fire, Helena, MT	13
July 9, 1953	Forest Fire, Alder Springs, CA	15
Nov. 1, 2, 1966	Forest Fires, Southern CA	18
	Water Transportation	
June 30, 1900	Steamship, Hoboken, NJ	326
June 15, 1904	Excursion Steamer, General Slocum, Hells Gate Passage, East River, New York, NY	1030
Sept. 8, 1934	S.S. Morro Castle, off the New Jersey Coast	135
Apr. 16, 1947	S.S. Grandcamp, Texas City, TX	468
Sept. 9, 1947	Queen Island, Passenger Vessel, Pittsburgh, PA	21
Jan. 17, 1956	S.S. Salem Maritime, Tank Ship, Lake Charles, LA	21
Dec. 19, 1960	U.S.S. Constellation, New York, NY	50
June 6, 1966	Ship Collision, New York, NY	37
Apr. 6, 1969	S.S. Union Faith, Mississippi River at New Orleans, LA	25
Feb. 1, 1972	S.S. V.A. Fogg, Tank Ship, Galveston, TX	39
Apr. 9, 1974	S.S. Elsis, Tanker, Tinicum Township, PA	11
Jan. 31, 1975	Ship Collision, Marcus Hook, PA	29
Nov. 5, 1979	Ship Collision, Galveston, TX	32
	Rail Transportation	
Sept. 27, 1915	Tank Car, Ardmore, OK	43
July 31, 1940	Train Collision, Cuyahoga Falls, OH	43
May 25, 1950	Street-Car Tank Truck Collision, Chicago, IL	34
June 28, 1959	Tank Car Derailment, Meldrim, GA	23
Mar. 1, 1960	Train-Tank Truck Collision, Bakersfield, CA	14
Dec. 28, 1966	Passenger Train-Tank Truck, Collision, Everett, MA	13
July 5, 1973	Tank Car, Kingman, AZ	13
Feb. 24, 1978	Derailment, Waverly, TN	16
	Highway Transportation	
Jan. 31, 1936	Prison Transport Van, Scottsboro, LA	20
Mar. 24, 1937	Bus Accident, Salem, IL	20
Aug. 4, 1952	Bus Accident, Waco, TX	28
Mar. 7, 1968	Bus-Auto Accident, Baker, CA	21
Apr. 30, 1975	LP Gas Tank Truck, Eagle Pass, TX	19
June 26, 1981	Converted Bus, San Bernardino, CA	10
	Air Transportation (fire deaths only)	
May 6, 1937	Zeppelin, Lakehurst, NJ	36
Mar. 20, 1969	DC-3, Kenner, LA	16
Nov. 28, 1970	DC-8, Anchorage, AK	47
Dec. 8, 1972	Aircraft Crash, Chicago, IL	45
Dec. 20, 1972	DC-9 Crash, Chicago, IL	10
Apr. 4, 1977	DC-9 Crash, New Hope, GA	28
Oct. 17, 1982	Aircraft Crash, Taft, CA	14
June 2, 1983	DC-9 Fire In-flight, Greater Cincinnati Airport, KY	23

In 1930, the fire on board the *S.S. Morro Castle* off the New Jersey coast resulted in international regulations on firesafety for vessels (see "Significant Historical Fires").

The 1937 fire at the Consolidated School in New London, Texas tragically pointed out the need for state laws to protect public buildings not subject to municipal ordinance and inspection. Then in the 1940s, a series of multiple-death fires, including The Rhythm Club, The Cocoanut Grove, and fires in The La Salle, Canfield, and Winecoff Hotels, focused national attention upon the need for adequate exits and other firesafety features in hotels and public buildings. These fires resulted in major changes to the "Building Exits Code" over a period of almost two decades. The standard for *Assembly Seating, Tents, and Air-supported Structures* (NFPA 102) was the result of still another multiple-death fire of the 1940s — the 1944 Hartford Circus Tent fire in which 168 people were killed.

Two hospital fires, St. Anthony's in Effingham, Illinois in 1949 and the Hartford Hospital in 1961 moved hospital administrators and fire prevention officials across the nation to assess the quality of construction and fire protection systems in hospitals.

The Our Lady of Angels School fire in Chicago on December 1, 1958 probably resulted in the swiftest action in the wake of any recent major fire since World War II. Within days of the fire, state and local officials throughout the nation ordered fire inspections of schools and within one year it was reported that major improvements in life safety were made in 16,500 schools across the country. Improvements in the frequency and quality of exit drills, inspections, the storage of combustible supplies, and the disposal of waste materials were also reported in almost every community where schools were surveyed.[6]

The effects of more recent fires such as The Beverly Hills Supper Club, The MGM Grand Hotel, and others are still being felt in the fire protection community.

The multiple-death fire record in nursing homes is one of the most striking examples of the response of government and the fire protection community to a serious problem. During the 1960s, there were 28 multiple-death fire incidents resulting in 211 deaths in nursing homes reported to the NFPA. This record appeared to be destined to repeat itself in the early 1970s. Between 1970 and 1976, there were 125 deaths in 13 multiple-death incidents. However, since 1977 there has been only one multiple-death fire in a nursing home reported to the NFPA. This fire, in Pampa, Texas in October 1982 killed three patients. Two code-related reasons have been given for this rather dramatic turnaround: (1) the increase in use of model building codes by state and local governments during the late 1960s and early 1970s, and (2) the significant decision by the Department of Health, Education and Welfare (now known as the Department of Health and Human Services), to enforce the NFPA's *Life Safety Code* in all nursing homes receiving federal funds.

The enforcement of these codes in nursing homes, in many cases retroactively, has resulted in improvements in the protection of vertical openings, interior finish, means of egress, compartmentalization, staff training, installation of fixed detection and alarm systems, and in many cases fixed suppression systems such as automatic sprinklers. These are the protection features fire investigators have been recommending for many years to improve life safety in buildings.

Another important lesson learned from the NFPA's fire experience records is the effectiveness of automatic sprinklers in preventing major loss of life fires. The NFPA has no record of a multiple-death fire in a completely sprinklered building where the system was properly operating, except where an explosion or flash fire killed or fatally injured the victims prior to operation of the system or where the victims were involved in fire fighting.

Multiple-Death Fires in Residential Properties

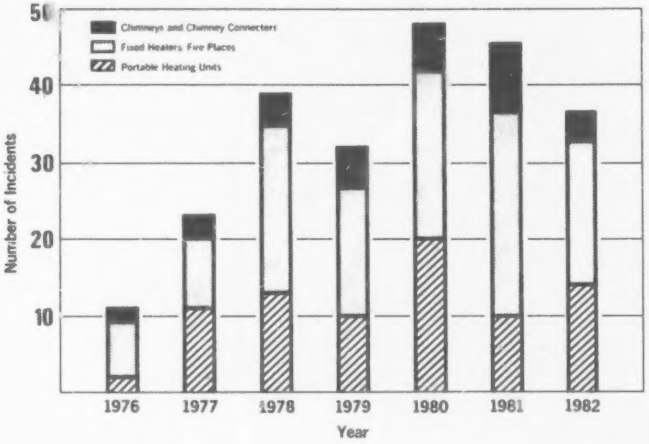
As previously discussed, most fire-related multiple deaths in the United States occur in residential properties. This section will discuss the leading accidental ignition scenarios of residential multiple-death fires, who dies in these fires, and strategies to prevent them.

The table accompanying this section presents the leading ignition scenarios for accidental multiple-death fires in residential properties for the period from 1973 to 1982. This table is based upon a study of 970 fires with 3,762 associated deaths. As in other similar studies of fatal fires,[7,8] cigarettes continue to be the leading cause of residential multiple-death fires, accounting for over 29 percent of the fires studied. Electrical malfunctions or overloaded circuitry follow, with over 15 percent. Fires presented in this table that result from matches or lighters would be primarily those that result from

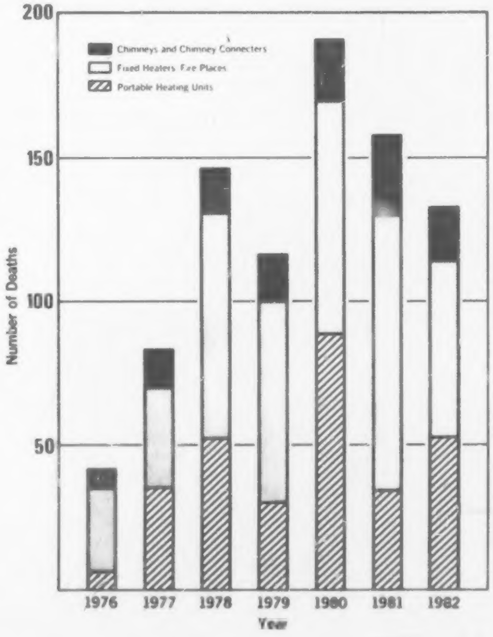
Ignition Scenarios for Accidental Multiple-Death Fires in Residential Properties (1973 to 1982)

Form of Heat of Ignition	Form of Material Ignited	Area of origin	Total Inc.	% Deaths
Cigarette 29.1%	Upholstered Furniture	Living Room	18.9	18.5
		Bedroom	0.9	1.1
		Dining Room	0.4	0.4
		Means of Egress	0.3	0.2
	Bedding	Bedroom	5.4	4.9
		Living Room	0.7	0.7
	Trash	Kitchen	1.1	1.0
		Living Room	0.3	0.2
	Soft Goods (Other than bedding)	Bedroom	0.4	0.4
		Living Room	0.3	0.2
	Other Furniture	Living Room	0.4	0.5
Electrical Equipment Arcing or Overloaded 15.1%	Structural Component	Living Room	3.4	3.2
		Concealed floor/ceiling space	1.5	1.6
		Concealed Wall Space	1.6	1.3
		Kitchen	1.3	1.3
		Bedroom	0.6	0.7
		Concealed Roof/Ceiling Space	0.6	0.5
		Closet	0.3	0.5
		Storage Area (Other than closet)	0.3	0.3
		Bathroom	0.3	0.3
	Cable Insulation	Living Room	1.3	1.2
		Kitchen	0.4	0.3
	Bedding	Bedroom	1.2	1.4
	Soft Goods (Other than bedding)	Living Room	0.5	0.5
		Bedroom	0.3	0.2
	Upholstered Furniture	Living Room	0.8	0.7
	Newspapers, Books, Decorations, Toys, etc.	Living Room	0.3	0.5
	Christmas Tree	Living Room	0.3	0.4
Match/Lighter 7.0%	Bedding	Bedroom	2.6	2.3
	Upholstered Furniture	Living Room	2.6	2.1
	Soft Goods (Other than bedding)	Closet	0.7	0.7
		Bedroom	0.7	0.7
	Newspaper, Books, Decorations, Toys, etc	Living Room	0.4	0.4
Solid Fueled Equipment 6.4%	Structural Component	Living Room	3.8	3.4
		Kitchen	1.1	1.2
		Bedroom	0.6	0.6
		Concealed Wall Space	0.3	0.2
	Upholstered Furniture	Living Room	0.6	0.7
Gas Fueled Equipment 4.4%	Cooking Materials	Kitchen	1.6	1.7
	Gas from Pipe or Container	Kitchen	0.8	0.7
		Living Room	0.6	0.7
	Structural Component	Kitchen	0.4	0.5
		Heating Equipment Room	0.4	0.4
	Soft Goods (Other than bedding)	Bathroom	0.3	0.3
		Kitchen	0.3	0.3
Properly Operating Electrical Equipment 3.6%	Cooking Materials	Kitchen	0.9	0.8
	Bedding	Bedroom	0.8	0.8
		Living Room	0.5	0.6
	Upholstered Furniture	Living Room	0.6	0.6
	Soft Goods (Other than bedding)	Bedroom	0.4	0.5
	Structural Component	Living Room	0.4	0.4
Candle 3.0%	Upholstered Furniture	Living Room	0.7	0.8
	Soft Goods (Other than bedding)	Living Room	0.7	0.7
	Bedding	Bedroom	0.6	0.6
	Newspapers, Books, Decorations, Toys etc	Living Room	0.4	0.3
	Structural Component	Living Room	0.3	0.5
	Other Furniture	Living Room	0.3	0.3
Liquid Fueled Equipment 1.7%	Fuel	Living Room	0.5	0.6
		Kitchen	0.3	0.3
		Bedroom	0.3	0.3
	Structural Component	Kitchen	0.3	0.4
	Spilled Liquid	Living Room	0.3	0.2

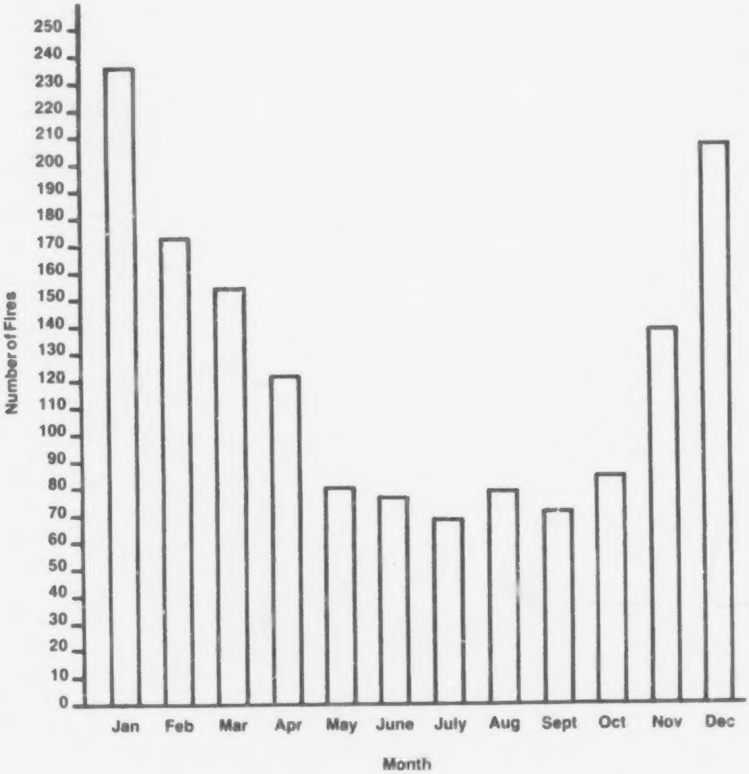
Auxiliary Heating Related Multiple-Death Fires in Dwellings and Apartments 1976-1982



Auxiliary Heating Related Deaths in Multiple-Death Fires in Dwellings and Apartments 1976-1982

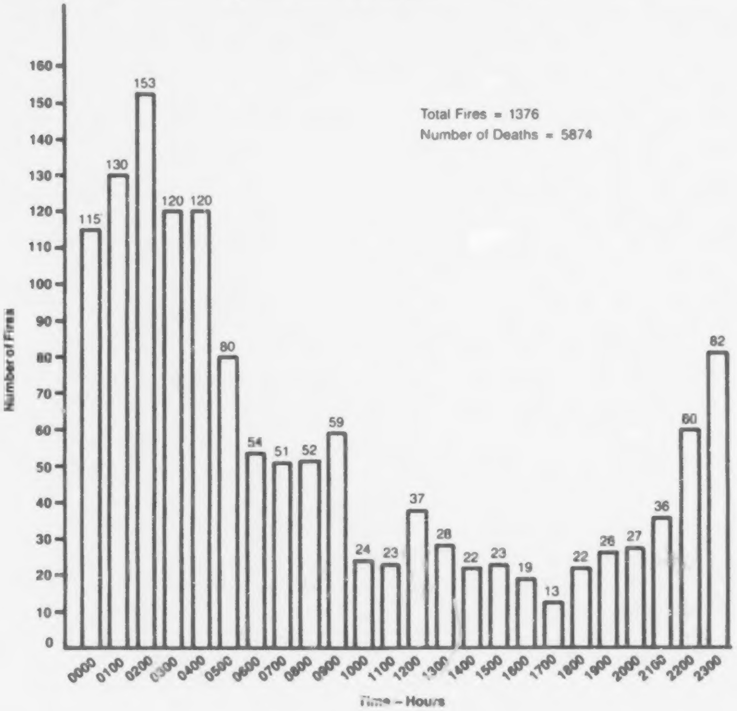


children playing and improper disposal, etc.; they are not incendiary in origin. Four of the last five forms of heat of ignition are involved with heating or cooking and account for just over 16 percent of the fires studied. These scenarios and the information presented in the two bar graphs show the impact of the use of alternative heating devices in private homes. This fire experience and the knowledge that millions of woodstoves, and portable electric and kerosene heaters have been sold in the U.S. during the last several years lead to the conclusion that heating-related fires will continue to kill hundreds of people each year. This conclusion is supported by data that show a sharp increase in incidents during the months from November to April, a time when some form of heating device is required in large areas of the U.S. (see graph).

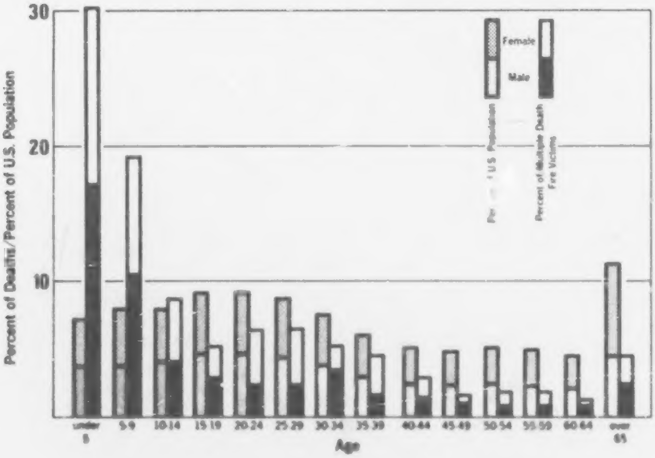


A study of the time of alarm for multiple-death fires for a recent 5-year period is shown in the graph below. Almost 75 percent of the fires studied occurred between the hours of 8:00 p.m. and 8:00 a.m., the time when most people are in their homes and asleep.

A study of the age and sex of multiple-death fire victims for 1982 is also shown below, and displays the very large percentage of multiple-death fire victims who are children. In 1982, nearly 59 percent of the multiple-death fire victims were under the age of 15. It appears that many of the victims are incapable of escape due to their age or lack of knowledge of what to do in the event of a fire.



Ages of Victims by Sex Compared with Ages in the General Population for 1982 Residential Multiple-Death Fires



As a result of the NFPA's continued study of residential multiple-death fire experience, several strategies can be presented to help reduce the loss of life in these fires.

1. *The installation and proper maintenance of smoke detectors in individual households.*[9]
   Based upon the study of the many factors that contributed to the large loss of life in a fire, this one precaution could have a significant impact.
2. *Encourage families to plan and practice a home escape plan.*
   When used with smoke detectors, this strategy will provide the most cost effective, easily implemented, and effective life saving protection available today.[10]
3. *Establish public firesafety education as a priority within the fire protection community.*
   People must be taught to protect themselves, their families, and friends from fire. This should include public campaigns to accomplish strategies 1 and 2 above, and to teach the safe use and installation of alternative heating devices, the proper storage and handling of flammable liquids, and the identification and correction of home fire hazards. Examples of lives saved as a result of ongoing public education programs are numerous.
4. *Remove the cigarette from the ignition sequence.*
   In recent years, there has been much discussion regarding changing the properties of cigarettes to make them more firesafe. It is important that fire protection leaders continue to press for such change as soon as possible. While other work with long-range impact is currently being done, such as improvements in the fire resistance of upholstered furniture, the impact of more firesafe cigarettes would be immediate and long lasting.
5. *Continue to research and develop methods to implement the use of residential sprinkler systems.*[11]
   Recent research has proven that residential sprinkler systems using specially designed fast-acting heads and domestic water pipe are both economical and effective. Further research has also shown the effectiveness of similar technology to protect existing hotels and motels. Several communities in the country have begun to require such systems in new homes, primarily in response to staff reductions on fire departments. The research and subsequent standard covering residential sprinkler systems (NFPA 13D, *Sprinkler Systems for One- and Two-Family Dwellings-1980*) relied upon common ignition scenarios developed in the study of multiple-death fires. When such systems are in common use, they will provide a very high level of protection to the occupants of dwellings. A reduction in the number of lives lost in residential fires should follow the increased use of residential sprinklers.

References

[1] Jon C. Jones, "1982 Multiple-Death Fires In The United States," *Fire Journal*, Vol. 77, No. 4 (July 1983), p. 10.

[2] Michael J. Karter, Jr., "Fire Loss In The United States During 1982," *Fire Journal*, Vol. 77, No. 5 (September 1983), p. 44.

[3] Percy Bugbee, *Principles of Fire Protection*, (Boston: National Fire Protection Association), 1978, p. 13.

[4] Paul R. Lyons, *Fire In America!*, (Boston: National Fire Protection Association), 1976.

[5] NFPA *101*, *Life Safety Code* - 1981, p. ix.

[6] Paul E. Teague, "Our Schools: How Safe Are They?," *Fire Journal*, Vol. 72, No. 6 (November 1978), p. 21.

[7] Walter G. Berl and Byron M. Halpin, "Human Fatalities From Unwanted Fires," *Fire Journal*, Vol. 73, No. 5 (September 1979), p. 105.

[8] Dr. Louis Derry, "Fatal Fires In America: How They Happen, Where They Happen, How To Stop Them," *Fire Journal*, Vol. 73, No. 5 (September 1979), p. 67.

[9] See NFPA 74, *Household Fire Warning Equipment-1980*.

[10] Such as Operation EDITH (Exit Drills In The Home) as supported by the NFPA and the Fire Marshals Association of North America.

[11] See NFPA 13D, *Sprinkler Systems for One- and Two-Family Dwellings-1980*.

Ignition Scenarios of One- and Two-Fatality Fires and Profiles of Fire Victims

Ignition Scenarios of One- and Two-Fatality Fires

In a September 1979 Fire Journal *article, "Fatal Fires in America," Dr. Louis Derry examined the ignition scenarios of fires that resulted in one or two fatalities (82 percent of all fire deaths are concentrated in such fires). The results and discussion presented here are based on that article.*

Introduction

A fire scenario is a chain of events bringing together a source of heat and a combustible material under conditions suitable for ignition. Break the scenario by eliminating or modifying the heat, the material, or the circumstance uniting these, and the fire will not occur. Review of fatal fire reports soon leads to the conclusion that a small number of scenarios recur in the ignition of fires and lead to many fire deaths. If these ignition scenarios can be identified in detail and possibly broken, the savings in lives could be substantial.

For example, in the most common types of one- and two-fatality fires (32 percent) cigarettes ignite either upholstered furniture in living areas or bedding in sleeping areas. Engineer a cigarette that is less likely to ignite upholstery and bedding, engineer the upholstery and bedding to better resist ignition, or educate and motivate the smoker to be more careful, and these two deadly chains leading to 32 percent of the deaths in one- and two-fatality fires are broken.

Ignition Scenarios

The leading ignition scenarios for one- and two-fatality fires are shown in the table below These scenarios account for over 50 percent of the deaths.

Highlights of this ranking are:

Cigarettes: The top two scenarios account for 32 percent of the national deaths in one- and two-fatality fires. In these scenarios, cigarettes ignite, respectively, upholstered furniture in living areas and bedding in sleeping areas. In all, cigarettes are responsible for ignition in 5 of the top 18 scenarios.

Motor Vehicle Crashes: The third and tenth ranking scenarios involve the ignition of fuel in vehicle crashes.

Clothing Ignition: In 3 of the leading scenarios, clothing on a person is ignited.

Heating and Cooking Equipment: This equipment provides the heat of ignition in 6 of the top scenarios.

Residential Areas of Origin: Residential areas dominate the scenario list: living area, sleeping area, kitchen.

Leading Ignition Scenarios for One- and Two-Fatality United States Fires, 1971-1978

Both Accidental and Incendiary and Suspicious Fires Are Included
(Out of 780 distinct scenarios, 52.6 percent of the deaths were concentrated in the 18 scenarios listed below)

Heat of Ignition	Material Ignited	Area of Origin	Percent of Deaths	Percent of Fires
Cigarette	Upholstered furniture	Living area	17.3	16.9
Cigarette	Bedding	Sleeping area	14.7	15.5
Highway motor vehicle crash	Fuel	Vehicle fuel tank	3.9	3.7
Match, lighter, candle	Bedding	Sleeping area	2.3	2.2
Heating, cooking equipment	Structural component	Living area	1.7	1.5
Cooking equipment	Clothes on a person	Kitchen	1.5	1.8
Cooking equipment	Cooking materials	Kitchen	1.4	1.8
Cigarette	Upholstered furniture	Sleeping area	1.4	1.4
Heating, cooking equipment	Fuel	Kitchen	1.2	1.3
Highway motor vehicle crash	Gasoline, LP-Gas	Truck cargo area	1.1	1.1*
Cigarette	Bedding	Living area	0.9	0.9
Heating, cooking equipment	Fuel	Living area	0.8	0.9
Match, lighter, candle	Upholstered furniture	Living area	0.8	0.7
Match, lighter, candle	Soft goods other than bedding or clothes on a person	Sleeping area	0.8	0.7
Match, lighter, candle	Clothes on a person	Sleeping area	0.7	0.8
Cigarette	Clothes on a person	Sleeping area	0.7	0.8
Heating equipment	Fuel	Heating equipment area	0.7	0.7
Match, lighter, candle	Fuel	Living area	0.7	0.6

Based on 5,405 civilian deaths in 4,493 one- and two-fatality fires with known ignition scenarios in the NFPA FIDO data.

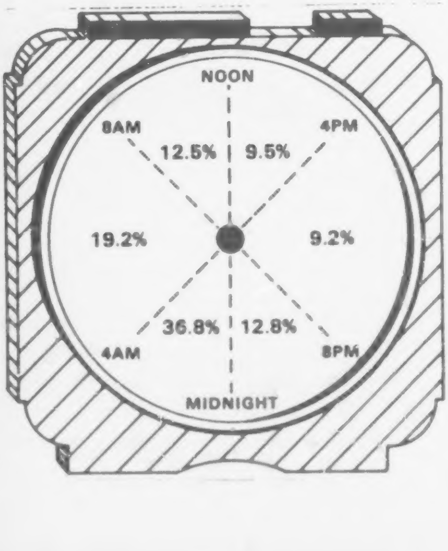
All percents in this Table refer to this data set.

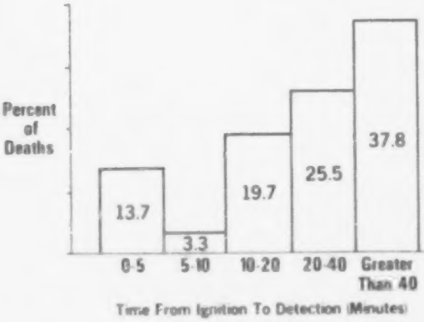
Out of 780 distinct scenarios in this data set, the 18 scenarios in this Table accounted for 52.6 percent of the deaths and 53.1 percent of the fires.

*The fires in this scenario are generally dramatic and are particularly well reported. For this reason, it is possible that the scenario is over-represented in the data. Further research will clarify this question.

Residential One- and Two-Fatality Fires by Time of Alarm and Time from Ignition to Detection

Over two-thirds of the 7,288 deaths reported and shown in the first graph below occurred between the hours of 8 pm and 8 am in fires that ignited and developed at night, trapping sleeping occupants. In residential one- and two-fatality fires, many of the deaths occurred when fire had a large headstart — over 40 minutes before discovery for 38





percent of the deaths. This means that in many instances, fires are not discovered in time for residents to escape or that the fire department did not have sufficient time to respond and rescue the occupants.

Preventing Fire Deaths

The fire death problem in all of its aspects is very complex, and comprehensive solutions must be equally complex. As we saw earlier, a small number of fatal ignition scenarios occur frequently and comprise the majority of total fire deaths.

The interventions discussed here are aimed at the key features of the fire death problem and offer the promise of saving a large number of lives.

Break the Ignition Chain:

- *Manage the Heat of Ignition*: Two principal approaches are to influence users to handle potential ignition sources more carefully and to engineer these sources to be less hazardous. Through its Learn Not To Burn Program media efforts, the NFPA promotes firesafe behavior for both children and adults using television, radio, and print messages. The NFPA Learn Not To Burn Curriculum is available for adoption by schools to use in teaching children firesafety.

  The cigarette is by far the most common heat of ignition in fatal fires. Recognizing this, the NFPA has endorsed efforts to develop and market more firesafe cigarettes. If such cigarettes should come into general use, the most common fatal fire ignition scenarios will be broken, and the resulting savings in lives could be dramatic and quickly realized.

  Electrical equipment and heating and cooking equipment contribute prominently to the fatal scenarios. The proper installation, maintenance, and use of such equipment will break many of these scenarios.

- *Manage the Material Ignited*: Reduction in the flammability of clothing and household furnishings will break many of the one- and two-fatality fire scenarios.

  The United States Consumer Product Safety Commission has issued flammability standards for children's sleepwear and mattresses, and has considered a standard for upholstered furniture. In the case of furnishings, the firesafety benefits are realized only in the long term, since such consumer items are generally in use for many years before being replaced. The Commission has no jurisdiction to regulate cigarettes, which commonly ignite these items.

  Fuel tanks ruptured in crashes of highway vehicles release flammable liquids that usually become the material first ignited in crash-related fires. The integrity of motor vehicle fuel systems is regulated by Federal Motor Vehicle Safety Standard 301-75. It will be some years yet before all vehicles in use comply with the current version of this Standard. Preliminary studies indicate the Standard has been effective in preserving the integrity of fuel systems during vehicle crashes; the evaluation of the Standard will be more complete when more data becomes available in the next few years. Also, the numbers of deaths in the vehicle crash and burn scenario will be influenced by number of miles driven and average speeds, both of which are sensitive to fuel supplies.

Detect the Fire Promptly:

- Smoke alarms are now widely available at low cost and effectively give early warning of a developing fire, so that evacuation, containment, and suppression can be initiated during the incipient stage of a fire. Such protection is especially appropriate to combat fatal residential fires that commonly claim sleeping victims at night.

  It is essential that such devices be properly installed and maintained, as recommended for one- and two-family dwellings in NFPA 74-1980, *Standard for the Installation, Maintenance, and Use of Household Fire Warning Equipment.*[1]

- An escape plan should be developed for use upon detection of a fire. In the case of residential fires, the NFPA, together with the Fire Marshals Association of North

1982 HOUSEHOLD SURVEY OF DETECTOR OWNER/NON-OWNER*

	Owners	Non-owners	Total
Total	67%	33%	100%
Ethnicity of head of household			
White	69%	31%	100%
Non-white	53%	47%	100%
Annual household income			
<$7,500	55%	45%	100%
$7,500–15k	63%	37%	100%
$15k-25k	64%	36%	100%
>$25k	75%	25%	100%
Highest level of education of head of house			
Less than high school	61%	39%	100%
Trade-high school graduate	67%	33%	100%
Some college	66%	34%	100%
College graduate	71%	29%	100%

Source: *Residential Smoke and Fire Detector Coverage in the United States: Findings from a 1982 Survey.* Prepared by Market Facts, Inc. for FEMA under FEMA contract number EMW-C-0638, September 1982.

*Data has been weighted by household size.

America, sponsors Operation EDITH (Exit Drills In The Home), which provides evacuation guidelines. The Learn Not To Burn Curriculum also provides information to school children on escape planning.[2]

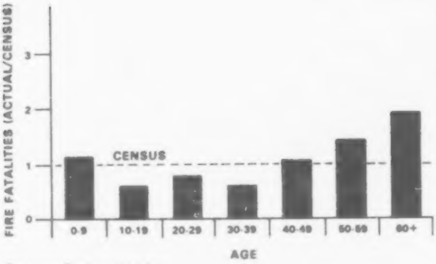
Smoke alarms in combination with escape plans, provide effective protection against deaths resulting from fires in a wide range of ignition scenarios.[3] A demographic study of the type of person who is apt to own a smoke detector was conducted for FEMA in 1982. According to FEMA, the study found that income is a significant factor in predicting whether a household has a smoke detector installed or not.[4] The study also found that only 55 percent of the families with income under $7,500 owned smoke detectors. For households with incomes between $7,500 to $25,000, 64 percent owned detectors while 75 percent of the households with incomes over $25,000 owned detectors. Fifty-three percent of the non-white population owned smoke detectors while 69 percent of the white population owned detectors. The study found some correlation between education and detector ownership; about 61 percent of the households where husband and wife each had less than a high school education owned smoke detectors, while 71 percent of the households where husbands and wife each had education beyond a college degree owned detectors. FEMA contends, and the NFPA agrees, that no matter which category one belongs to, having a smoke detector in the home is a major step in improving firesafety.

Limit Fire Growth by Automatic Suppression:

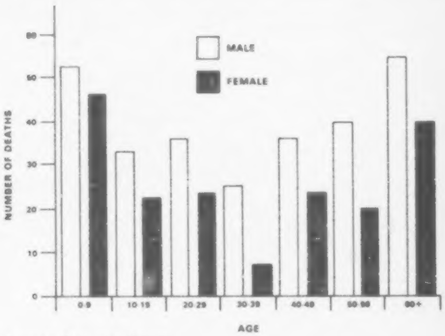
- Current research has shown that quick response residential sprinklers can be very effective for extinguishing or containing fast developing residential fires.[5] Recommendations for residential sprinklers are presented in NFPA 13D-1980, *Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Mobile Homes.*

Profile of Fatal Fire Victims

Berl and Halpin researched 463 fire fatalities that occurred from 1972 to 1977 in Maryland.[6] Their study has contributed substantially to the understanding of the demographic characteristics of fire casualties and the physical and biochemical reasons for these deaths.



Source: Berl and Halpin



Source: Berl and Halpin

Fire Fatalities by Age and Sex

The study found that a disproportionate number of fire deaths occurred among the very young and the elderly — nearly 22 percent occurred in those aged 9 years or less and 20 percent in those 60 years or more. Other studies as well show the same trend of a disproportionate number of fire deaths among the very young and the elderly when compared with their proportion in the U.S. population. This phenomenon can be partially explained by the inability of these individuals to successfully escape from the fire scene and their low tolerance to toxic gases and other combustion products.

The research indicated that the number of male fire deaths overall was about 1½ times the number of female fire deaths. Data reported from 1978 by the U.S. Fire Administration showed similar results. Nationwide, the fire death rate of males (41.0 deaths per million people) was nearly twice the rate of females (23.0). Berl and Halpin noted that greater alcohol use among men, especially those over 20 years of age, played a significant role in the higher number of fire deaths among males.

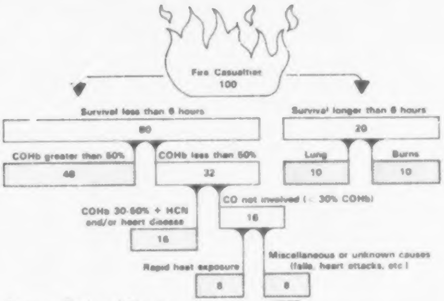
Fire Fatalities by Age and Blood Alcohol Level

When 454 fire victims were examined for blood alcohol level (BAL), 35 percent had BAL in excess of 0.1 percent (the legal definition of drunkenness in Maryland). Over two-thirds of the heavily intoxicated victims were men. With substantial alcohol ingestion, the ability to act quickly, decisively, and correctly in response to fire is inhibited, increasing the chances of a fatal outcome.

Distribution of Fire Fatalities by Age and Blood Alcohol Level (BAL) in Maryland

AGE	0		.01-.09		≥.10	
	No.	Percent	No.	Percent	No.	Percent
0-9	98	100	0	0	0	0
10-19	44	77.2	7	12.3	6	10.5
20-29	39	62.9	5	8.0	18	29.3
30-39	8	23.5	3	8.8	23	67.6
40-49	14	25.0	5	8.9	37	66.0
50-59	15	25.9	3	5.1	40	69.9
60 +	47	52.8	7	7.9	35	39.2
TOTALS	265	—	30	—	159	—

Based on a study of 454 fire deaths that occurred from 1972-1977 in the state of Maryland. Source: Berl and Halpin.


Fire Casualties
100
Survival less than 6 hours
80
Survival longer than 6 hours
20
COHb greater than 50%
48
COHb less than 50%
32
Lung
10
Burns
10
COHb 30-50% + HCN and/or heart disease
16
CO not involved (< 30% COHb)
16
Rapid heat exposure
8
Miscellaneous or unknown causes (falls, heart attacks, etc.)
8

Source: Berl and Halpin

Fire Fatalities by Medical Cause

The leading medical cause of civilian fire deaths is the inhalation of smoke (toxic gases) alone or combined with burns. Berl and Halpin found that nearly 60 percent of the fire victims had carboxyhemoglobin (COHb) levels exceeding 50 percent, a concentration considered as the margin for survival. An additional 16 percent of the victims had COHb levels in the 30 to 50 percent range and were found to have also ingested substantial doses of hydrogen cyanide (HCN). There are indications from animal experiments that carbon monoxide and hydrogen cyanide act in an additive fashion, so that exposure to sublethal concentrations of these gases may prove fatal. In addition, other research has shown that persons with impaired cardiovascular systems (heart disease) have less resistance to toxic gases and tend to succumb at carbon monoxide levels less than 50 percent. In all, the preponderant involvement of smoke inhalation (toxic gases) is the primary cause of all fire deaths (75 percent of all fatalities are due to toxic gas ingestion).

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[1] A recent paper by A. Elwood Willey analyzed reasons for the unsuccessful performance of smoke alarms. See "Factors in Unsuccessful Smoke Detector Performance in Residential Occupancies," *Fire Journal*, Vol. 73, No. 3 (May 1979), p. 42.

[2] For the key issues in evacuation planning, see Anthony O'Neill, "Escape Planning," *Fire Journal*, Vol. 38, No. 6 (November 1974), p. 10.

[3] Based on analysis of a sample of fatal fires, Halpin, Dinan, and Deters concluded that many lives could have been saved by smoke alarms. (See Byron M. Halpin, John J. Dinan, and Owen J. Deters, "Assessment of the Potential Impact of Fire Protection Systems on Actual Fire Incidents," APL/JHU FPP TR 35, The Johns Hopkins University/Applied Physics Laboratory, Laurel, MD, October 1977.)

[4] *Fire In the United States* (Fourth Edition), Federal Emergency Management Agency, Washington, DC, 1982, pp. 25-27. (Available from the National Technical Information Service, 5285 Port Royal Rd., Springfield, VA 22161.)

[5] Under contract to the United States Fire Administration, the NFPA investigated the effectiveness of proposed residential sprinkler systems.

[6] Berl, Walter C., and Halpin, Byron M., "Human Fatalities from Unwanted Fires," *Fire Journal*, Vol 73, No. 5, (September 1979), pp. 105-115.

Fatal House Fires in an Urban Population

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House fires kill about 5,000 Americans annually, at a rate (2/100,000) that has remained almost constant for the past 50 years. House-fire deaths were studied in Baltimore, where 55 residents died during a three-year period. More than half of the deaths resulted from cigarette-ignited fires; 39 percent of the people who died in such fires were not the cigarette smokers themselves. For both blacks and whites, the death rate was highest in census tracts where property rental values were low. The death rate from fires ignited by heating or electrical equipment was nine times as high in the lowest-value census tracts as in the highest.

Three fourths of all fire-related deaths in the United States result from house fires, which cause 5,000 deaths annually.[1] For ages 1 to 64 years, house fires are the leading cause of death from unintentional injury in the home.

House-fire deaths in Baltimore were studied to determine death rates in relation to property rental value, to analyze important contributing factors, and to suggest potential preventive measures. Of particular interest were fires ignited by cigarettes, the reported source of ignition in 13 percent to 30 percent of all fires[2,3] and in 47 percent of fatal fires.[4]

Methods

Case reports of all unintentional deaths related to house fires in Baltimore from 1976 to 1978 were reviewed at the Office of the Chief Medical Examiner of Maryland. Information about the cause of each fire was obtained from a synopsis of the fire investigator's report. The 55 deaths included in the study were consistent with the International Classification of Diseases classification (E890) of "conflagration of private dwelling."

The 1977 Baltimore population, interpolated from 1970 and 1980 census data, was used as a denominator for death rates. To compute house-fire death rates in relation to an economic measure, the Baltimore population was divided into quintiles on the basis of census tract median rental values (MRVs). (The MRVs for each census tract were determined by the Bureau of the Census from 1970 census data. The 200 census tracts in Baltimore were ranked by MRV, then subdivided into five groups, each containing one fifth of the total population. In addition, MRV quintiles were determined separately for the white and black populations.) Each death was assigned to one of the five MRV groups on the basis of the MRV of the census tract of residence.

Nonresidents were excluded. Since deaths of city residents that occurred outside the city were not known, death rates may underestimate actual mortality.

Results

The average annual death rate from house fires for Baltimore residents was 2.2/100,000 during the three-year period 1976 to 1978. The death rate for males was 2.6; for females, 1.8. The death rate for blacks was twice the death rate for whites — 2.8 compared with 1.4. Sixteen (29 percent) of the deaths occurred in children aged 0 to 14 years; children aged 0 to 4 years had the highest death rate (4.3). Persons aged 60 and older had the second highest rate (2.7).

For the lowest two median rental value quintiles (MRVQs) combined, the death rate was 3.4, compared with 1.0 for the two highest. Sixty percent of deaths among blacks and 75 percent among whites occurred in the lowest two MRVQs, where only 40 percent would

House-Fire Deaths in Relation to Median Rental Value

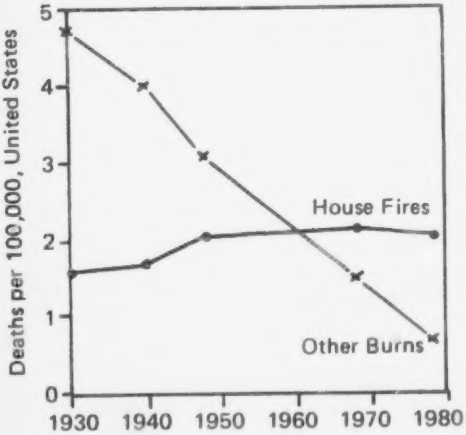
Median Rental Value Quintile	No. of Deaths	No. of Fires	No. of Fires With Multiple Deaths	% of Fires With Multiple Deaths
1	13	10	3	35
2	22	13	5	
3	10	8	1	13
4	7	5	1	13
5	3	3	0	
Total	55	39	10	26

be expected if house-fire deaths were evenly distributed among the respective populations. Forty-seven percent of the deaths occurred in multiple-death fires, which occurred predominantly in the two lowest MRVQs (Table 1). The highest death rate in MRVQ 2 compared with MRVQ 1 was associated with more multiple-death fires.

Fire investigators attributed 55 percent of the fires (56 percent of deaths) to cigarettes, typically on the basis of evidence that fire broke out in a smoldering mattress or upholstered furniture and that cigarette smokers were involved. The death rate from cigarette-ignited fires was 1.6 in MRVQs 1 and 2 and 0.8 in MRVQs 4 and 5. The percentage of house-fire deaths caused by cigarettes increased with median rental value (Table 2). Five of the 16 children in the study died in cigarette-ignited fires. Altogether, at least 12 (39 percent) of the 31 persons who died in cigarette-ignited house fires were not the smokers of the cigarettes.

Nine of the 11 deaths related to heating or electrical equipment occurred in the two lowest MRVQs (Table 2). The death rate from these fires was 0.9 in MRVQs 1 and 2 and 0.1 in MRVQs 4 and 5.

Postmortem tests for alcohol were performed on 33 persons aged 15 years or older, 13 (39 percent) had blood alcohol concentrations (BACs) of 0.10 percent by weight or higher. (Four of the six adults not tested survived more than four hours, making BAC at death an unreliable indicator of BAC at time of injury.) Blood alcohol concentrations of 0.10 percent



Death rates from house fires and from other fires and burns, 1930 to 1978, United States. Dates not available for 1949 to 1967, because sixth and seventh revisions of International Classification of Diseases combined house fire (conflagrations) with all other fires and burns. Rates are from reference 5 and from unpublished data supplied by the National Center for Health Statistics.

House-Fire Deaths by Ignition Source and Median Rental Value

	Median Rental Value Quintile			
Ignition Source	1 and 2	3	4 and 5	Total
Cigarette (% of total)	16 (46%)	7 (70%)	8 (80%)	31 (56%)
Electrical or heating equipment	9	1	1	11
Matches	1	1	0	2
Other*/unknown	9	1	1	11
Total	35	10	10	55

*Other: two grease fires, one bed ignited by candle, one coat ignited on register. In seven cases, ignition source was not identified.

or higher were found in 11 of 22 (50 percent) of the adults who died in cigarette-ignited house fires, compared with two of 11 (18 percent) in other house fires ($P<.1$).

Forty-five percent of all deaths resulted from fires that occurred in the four-hour period from 2 to 6 a.m.

Comment

During the past half century, while the death rate from other fires and burns has decreased dramatically, the death rate from house fires has remained fairly constant[1,5] (see figure). In part, this difference may reflect progress in burn treatment, which would have had its greatest effect on mortality caused by burns from other sources, since most house-fire deaths occur before medical treatment can be given. Changes in products have also reduced burn mortality. The number of deaths caused by clothing ignition dropped sharply in the 1960s, especially deaths of girls, in connection with changes in clothing styles and fabrics.[6]

Several studies have pointed to greater morbidity and mortality resulting from burns in economically disadvantaged groups. Barancik and Shapiro[7] reported higher rates of clothing-ignition burns among the population quintile with the lowest median income. Moyer[8] cited substandard housing and hazardous heating devices as probable factors in the higher burn-death rates among blacks and in southern states. The Baltimore data reported herein provide the first evidence of a strong correlation between economic conditions and house-fire deaths for both blacks and whites.

Important avenues for future research include the characteristics of low-rent housing: for example, ignition sources, flammability of building materials, potential toxicity of combustion products, warning systems, and egress. Most housing units in low-income areas are rented, which may make hazards easier to regulate than in the case of owner-occupied units. The role of electrical and heating equipment deserves special scrutiny, since deaths related to improper or faulty heating and electrical systems were nine times more frequent in low-rental than in high-rental census tracts.

Alcohol is a major factor not only in house fires but also in vehicle crashes, drownings, and many other injuries.[9] Unfortunately, there is no evidence to support hopes that a large proportion of alcohol-related deaths can be prevented by changing alcohol-related behaviors. Similarly, it is not likely that the incidence of cigarette-initiated house fires can be substantially reduced by making cigarette smokers more careful.

Nationally, 2,300 house-fire deaths each year are attributed to cigarettes.[10] In our study, the cigarette was the principal ignition source in all rental value quintiles and accounted for eight of the ten deaths in the two highest quintiles. Typically, cigarette-ignited fires occur when a cigarette falls unnoticed into bedding or upholstered furniture and smolders for hours.[10] By the time fire breaks out, people are asleep. If intoxicated, they are less aware of a dropped cigarette, less likely to be roused by smoke or fire, and less able to escape. Most deaths are due to carbon monoxide poisoning from smoke inhalation rather than burns.[4,11]

One promising measure for preventing cigarette-related house-fire deaths is the development and sale of cigarettes that self-extinguish before they ignite fires. The Cigarette Safety Act currently before Congress would give the Consumer Product Safety Commission jurisdiction over the cigarette as a fire hazard.[10] Cigarette brands already vary greatly in two characteristics that influence their fire-igniting potential: the temperature at which they burn and the length of time they smolder before self-extinguishing. It is expected that some existing brands, including ones advertised as having no chemical additives, would meet a fire-safe standard set in accordance with the proposed Cigarette Safety Act.[12] At least 19 patents for self-extinguishing cigarettes have been registered.[10]

To date there is no evidence that smokers prefer cigarettes that continue to smolder until completely consumed. Against such preferences—if indeed they exist—should be weighed the many deaths of nonsmokers in cigarette-ignited fires. (The effect on other people of products purchased for "personal use" was also exemplified by a study showing that the majority of people injured in crashes do not own the cars in which they are injured.[13])

Fatal house fires often start during early morning hours when people are sleeping soundly. Effective detection and alerting systems are therefore especially important. A review of 699 fires in residences protected with smoke detectors showed that smoke detector alarms reduced the potential for severe injury or death in 90 percent of the fires that occurred when all occupants were asleep.[14]

A national survey indicated that about 30 percent of families with less than $10,000 income have smoke detectors, compared with about 60 percent of families with income of $20,000 or more.[15] Other researchers have reported a greater risk of house fires in rental property[2] and a lower rate of smoke detector installation by renters than by homeowners.[16] Thus, there seems to be an inverse correlation between the risk of fire and the likelihood of being protected with a smoke detector.

Materials that reduce toxic by-products of combustion, designs that prevent the spread of fire, automatic sprinkler systems, and adequate escape routes are essential but long-term measures. In the meantime, modification of ignition sources and continued efforts to protect homes with effective alerting systems probably offer the greatest potential for reducing house-fire deaths and injuries.

This investigation was supported by the Insurance Institute for Highway Safety and the Maryland Medical Legal Foundation.

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U.S. Civilian Deaths and Injuries, 1978-82

1978-82 Civilian Fire Deaths

Estimates of total U.S. civilian fire deaths for the period 1978-82 indicate that, on the average, 6,900 civilians died annually from fire. The high number of total civilian fire deaths in 1978, (7,710), and 1979, (7,575 deaths) compared to the other years can in large part be attributed to differences in estimates of vehicle fire deaths for those years. (Estimates of civilian deaths due to vehicle fires will be discussed later in this section.)

The NFPA feels that trend analysis of civilian deaths should focus on estimates of civilian deaths in structure fires, since these estimates are based on fairly accurate reported data to the NFPA in its annual sample survey and FIDO (Fire Incident Data Organization) System. Over the 1978-82 period, an average of 5,790 civilians died annually in structure fires. Most of these deaths (96.2 percent or an annual average of 5,575 deaths) occurred in fires in residential structures. In particular, fires in the home (one- and two-family dwellings and apartments) resulted in 93.0 percent of all structure deaths, or an annual average of 5,385 deaths. The graph on p. 150 shows civilian fire deaths and rates in the home in the United States for 1978-82. The number of civilian fire deaths in the home were at their high at 6,015 in 1978, declined to 5,500 in 1979, and declined further to 5,200 deaths in 1980. There was a slight increase in 1981 to 5,400 fire deaths, and a decrease in 1982 to 4,820. Overall there was a decrease of 19.9 percent percent in civilian home fire deaths from 1978-82. Hopefully this impressive decrease is the result of recent home firesafety efforts, including numerous local ordinances and state laws that require the installation of smoke detectors in residential properties. The recent decrease in civilian fire deaths should encourage us to continue home firesafety education on topics such as

Highlights of 1978-82 U.S. Fire Experience

- Overall, there was a decrease of 21.9 percent in total civilian deaths from fire over the 1978-82 period, from a high of 7,710 in 1978 to a low of 6,020 in 1982.
- There was a 19.9 percent decrease of civilian fire deaths in the home (one- and two-family dwellings and apartments) during the 1978-82 period, from a high of 6,015 in 1978 to a low of 4,820 in 1982.
- An average of 6,900 civilians died annually from fire.
- An average of 5,790 civilians died annually in structure fires, 83.9 percent of all fire deaths.
- Most of the structure fire deaths, 96.2 percent or an annual average of 5,575 deaths, occurred in fires in residential structures.
- About 14 percent of all civilian fire deaths in structures occurred as a result of incendiary or suspicious fires.
- Annual estimates of civilian injuries indicate little change from year to year and show that on the average, about 30,460 civilians are injured annually. (This estimate for civilian injuries is on the low side, due to underreporting of civilian injuries to the fire service.)
- Total fires attended by public fire departments were at 2,817,500 in 1978, increased slightly in 1979, and reached a five-year high in 1980 at 2,988,000 fires. Total fires decreased in 1981, and again in 1982 when they hit a five-year low at 2,538,000. On the average, fire departments attended 2,816,500 fires annually over the five-year period.
- Estimates of structure fires indicate a pattern similar to that just described for total fires with the high occurring in 1980 at 1,065,000 structure fires, and the low occurring in 1982 at 946,500. On the average, 1,027,500 structure fires occurred annually, accounting for 36 percent of all fires.
- An average of 723,800 fires or 70 percent of all structure fires occurred annually in residential properties.
- Overall, property loss increased during the 1978-82 period. For structure fires during the 1978-81 period, property loss increased dramatically from $4,022,000,000 in 1978 to $5,976,000,000 in 1981, an increase of 49 percent over the four-year period; while in 1982, structure property loss decreased to $5,731,000,000, the result of the significant decrease in structure fires that occurred in 1982.
- Over the 1978-82 period, average property loss per structure fire increased every year of the five-year period. When the effects of inflation are adjusted for, however, there is hardly any change in average property loss per structure fire over the five-year period.
- Structure fires accounted for an average 88 percent of all property loss annually, while vehicle fires accounted for 10 percent.
- One- and two-family dwellings accounted for an annual average of 45 percent of structure fire loss during the five-year period; this was followed by industry, utility, and defense at 14 percent, stores and offices at 11 percent, and storage at 10 percent.
- Total direct property loss as a result of incendiary or suspicious structure fires increased during the 1978-80 period from $1,067,000,000 in 1978 to $1,760,000,000 in 1980, a substantial increase of 65 percent over the three-year period, but decreased in 1981 to $1,658,000,000, and in 1982 further decreased to $1,604,000,000. The decrease in 1982 was due to the significant decrease in the number of incendiary or suspicious fires that occurred in 1982.
- Over the 1978-82 period, the average property loss per incendiary or suspicious structure fire increased every year except for 1981. When the effects of inflation are adjusted for over the five-year period, the trend results are insignificantly affected.

common causes of fatal fires in the home, the use and maintenance of smoke detectors, and escape planning. (For more details on the causes of fatal fires, see sections "Ignition Scenarios of One- and Two-Fatality Fires and Profiles of Fire Victims" and "Multiple-Death Fires.") The graph also displays civilian fire deaths in the home per million population, and a trend similar to the number of civilian fire deaths in the home can be seen.

Over the 1978-82 period, fires in nonresidential structures accounted for 3.7 percent of all civilian fire deaths in structures. It should be noted that one large loss-of-life fire can have a tremendous impact on this statistic, as in 1977 when the Beverly Hills Supper Club fire claimed 165 lives.

As noted earlier, estimates of civilian deaths due to vehicle fires (particularly highway vehicle fires) may be somewhat unreliable, because of the difficulty in determining the cause of death in cases when a death occurred in a vehicle accident with a subsequent fire — i.e., was the death due to impact or to the fire itself? It should be noted that the NFPA made a strong effort to verify all reported vehicle fire deaths in the 1982 survey, with follow-up calls to fire departments to determine whether a reported vehicle death was caused by impact or fire. The estimate of 1982 civilian fire deaths due to highway vehicle fires, based on verified data, is 575, compared to an estimate of 790 based on originally reported data; this type of verification was also made for the 1980 and 1981 surveys. No such effort was implemented in 1978 and 1979 surveys and this may partially account for the high estimates of vehicle fire deaths for those years.

About 14 percent of all civilian fire deaths in structures occurred as a result of incendiary or suspicious fires during the 1978-1982 period.

ESTIMATES OF U.S. CIVILIAN FIRE DEATHS BY SELECTED PROPERTY BREAKDOWNS (1978-82)

	1978	1979	1980	1981	1982
Structure (total)	6,350	5,970	5,675	5,760	5,200
Residential[1]	6,185	5,765	5,446	5,540	4,940
Nonresidential[2]	165	205	229	220	260
Vehicle[3]	1,255	1,535	740	840	695
Other[4]	105	70	90	100	125
TOTAL	7,710	7,575	6,505	6,700	6,020

Estimates are based primarily on data reported to the NFPA by fire departments that responded to the NFPA's Annual Survey of Fire Departments for U.S. Fire Experience (1978-82); some of the estimates are based on data reported to the NFPA in the FIDO (Fire Incident Data Organization) System.

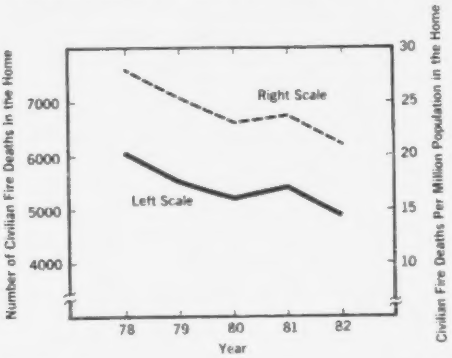
[1] Includes one- and two-family dwellings, apartments, hotels and motels, and other residential properties.

[2] Includes public assembly, educational, institutional, stores and offices, industry, utility, storage, and special structure properties.

[3] Includes highway and other vehicles (e.g., trains, ships). Estimates for 1978 and 1979 were based on data reported by fire departments but unverified, while estimates for 1980-82 were based on reported data by fire departments that were verified. Because of this factor, vehicle estimates for 1978 and 1979 may be on the high side and should not be compared to estimates for 1980-82.

[4] Includes outside properties with value, brush, rubbish, and other.

Civilian Fire Deaths and Rates In the Home* in the U. S. (1978-1982)



Source: NFPA's Annual Survey of Fire Departments for U. S. Fire Experience 1978-1982

* Includes one and two family dwellings and apartments

1978-82 Civilian Injuries

The results shown here are based on the NFPA's Annual Survey of Fire Departments for U.S. Fire Experience (1978-82). It should be kept in mind that due to underreporting of civilian injuries to the fire service (e.g., minor injuries that did not require immediate medical attention, injuries that occurred at small fires that the fire department did not attend, or injured persons who may not have been transported to medical facilities by the fire service), the NFPA feels that the annual estimates for civilian injuries are on the low side.

Annual estimates of U.S. civilian fire injuries for the 1978-82 period indicate little change from year to year and show that on the average, about 30,460 civilians are injured annually. Over the five-year period, residential fires accounted for about 68 percent of all civilian injuries reported to fire departments.

ESTIMATES OF U.S. CIVILIAN FIRE INJURIES BY SELECTED PROPERTY BREAKDOWNS AND YEAR (1978-82)

	1978	1979	1980	1981	1982
Structure (total)	24,985	24,850	24,725	25,700	25,575
Residential[1]	21,260	20,450	21,100	20,375	21,100
Nonresidential[2]	3,725	4,400	3,625	5,325	4,475
Vehicle[3]	3,720	5,175	4,075	3,400	3,425
Other[4]	1,120	1,300	1,400	1,350	1,525
TOTAL	29,825	31,325	30,200	30,450	30,525

Estimates are based on data reported to the NFPA by fire departments that responded to the NFPA's Annual Survey of Fire Departments for U.S. Fire Experience (1978-82); adjustments were made based on data reported to the NFPA in the FIDO (Fire Incident Data Organization) System.

[1] Includes one- and two-family dwellings, apartments, hotels and motels, and other residential properties.

[2] Includes public assembly, educational, institutional, stores and offices, industry, utility, storage, and special structure properties.

[3] Includes highway and other vehicles (e.g., trains, ships).

[4] Includes outside properties with value, brush, rubbish, and other.

1978-82 Number of Fires and Property Loss

Total fires were at 2,817,500 in 1978, increased slightly in 1979, and were at their high in 1980 at 2,988,000 fires. Total fires decreased in 1981, and also in 1982 when they reached the low of the five-year period at 2,538,000. On the average, over the five-year period, public fire departments attended 2,816,500 fires annually.

Over the 1978-82 period, estimates of the number of structure fires indicate a pattern similar to that for total fires with the high occurring in 1980 at 1,065,000 structure fires and the low occurring in 1982 at 946,500. On the average, 1,027,500 structure fires occurred annually, accounting for 36 percent of all fires during the five-year period. Also, over the five-year period vehicle fires accounted for an annual average of 547,500 fires, while outside fires and others accounted for an annual average of 1,241,500 fires. An average of 723,800 fires occurred annually in residential properties, accounting for 70 percent of all structure fires over the five-year period.

Examination of total direct property loss over the 1978-82 period indicates that: 1) during the 1978-81 period, property loss increased dramatically from $4,498,000,000 in 1978 to $6,676,000,000 in 1981, an increase of 48 percent over the four-year period, and 2) in 1982, property loss decreased to $6,432,000,000, largely as a result of the highly significant decrease in fires that occurred in 1982. Examination of structure property loss over the 1978-82 period indicates a similar pattern: 1) during the 1978-81 period, property loss increased dramatically from $4,022,000,000 in 1978 to $5,976,000,000 in 1981, an increase of 49 percent over the four-year period, and 2) in 1982, structure property loss decreased to $5,731,000,000, also the result of a highly significant decrease in structure fires in 1982. Over the 1978-82 period, average property loss per structure fire increased every year of the five-year period (see graph next page). The graph also suggests that when the effects of inflation are adjusted for, there is hardly any change in average property loss per structure fire over the five-year period.

Structure fires accounted for an average 88 percent of all fire property loss annually during the 1978-82 period, while vehicle fires accounted for 10 percent. Fires in one- and two-family dwellings accounted for an annual average of 45 percent of all structure fire loss during the five-year period. Other property categories contributing heavily to total structure property loss were industry, utility, and defense (an average of 14 percent for the five years), stores and offices (11 percent), and storage (10 percent). (Every year, over 10 percent of total property damage in the United States results from "large-loss" fires; for more details see *Almanac* section on "Large-Loss Fires.")

ESTIMATES OF NUMBER OF FIRES ATTENDED BY FIRE DEPARTMENTS BY MAJOR PROPERTY USE IN THE UNITED STATES BY YEAR (1978-82)

	1978	1979	1980	1981	1982
Residential (Total)	730,500	721,500	757,500	733,000	676,500
One- and Two-Family Dwellings*	569,000	550,500	590,500	574,000	538,000
Apartments	137,500	146,000	143,500	137,000	116,500
Hotels and Motels	12,000	11,500	11,500	11,500	10,500
Other Residential	12,000	13,500	12,000	10,500	11,500
Public Assembly	29,500	30,500	29,000	28,500	28,000
Schools and Colleges	20,500	22,500	19,500	19,500	16,500
Institutions	39,000	29,500	28,000	27,000	29,500
Stores and Offices	63,500	64,000	62,000	65,500	56,000
Industry, Utility, Defense**	55,000	58,000	55,000	49,000	42,000
Storage in Structures	59,500	64,500	65,500	62,000	54,000
Special Structures	64,500	46,000	48,500	43,000	44,000
TOTAL STRUCTURE FIRES	1,062,000	1,036,500	1,065,000	1,027,500	946,500
Outside Fires (with value)	110,000	80,500	86,500	81,000	54,000
Vehicles***	503,000	495,500	471,500	466,500	443,000
Brush, Grass, Wildland (no value)	582,500	614,500	718,500	711,000	522,500
Rubbish	296,000	342,000	397,000	341,000	309,500
All Other	264,000	276,500	249,500	266,500	262,500
TOTAL FIRES	2,817,500	2,845,500	2,988,000	2,893,500	2,538,000

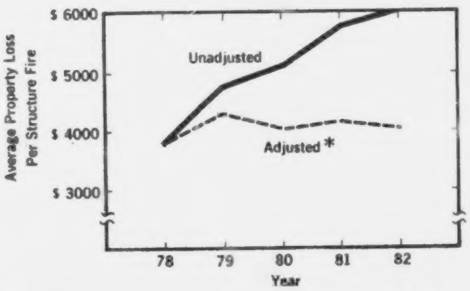
Estimates are based on data reported to the NFPA by public fire departments that responded to the NFPA's Annual Survey of Fire Departments for U.S. Fire Experience (1978-1982). No adjustments were made for fires not attended by the public fire service.

*Includes mobile homes.

**Since some incidents for these property uses were handled only by private fire brigades or fixed suppression systems and were not reported to the NFPA, the results represent only a portion of U.S. fire experience.

*** This category includes highway vehicles, trains, boats, ships, aircraft, farm vehicles, and construction vehicles.

Average Property Loss Per Structure Fire in the United States (1978-1982)



Source: NFPA's Annual Survey of Fire Departments for U.S. Fire Experience 1978-1982

* Adjusted for inflation based on Consumer Price Index. 1978 used as base year

ESTIMATES OF DIRECT PROPERTY LOSS BY MAJOR PROPERTY USE IN THE UNITED STATES BY YEAR (1978-82)

	1978	1979	1980	1981	1982
Residential (Total)	$2,192,000,000	$2,529,000,000	$3,042,000,000	$3,259,000,000	$3,253,000,000
One- and Two-Family Dwellings	1,784,000,000	2,034,000,000	2,447,000,000	2,713,000,000	2,794,000,000
Apartments	310,000,000	343,000,000	401,000,000	415,000,000	353,000,000
Hotels and Motels	82,000,000	100,000,000	154,000,000	99,000,000	84,000,000
Other Residential	16,000,000	52,000,000	40,000,000	32,000,000	
				Y22,000,000	
Public Assembly	194,000,000	284,000,000	326,000,000	356,000,000	381,000,000
Schools and Colleges	111,000,000	79,000,000	101,000,000	184,000,000	161,000,000
Institutions	14,000,000	34,000,000	25,000,000	38,000,000	17,000,000
Stores and Offices	475,000,000	457,000,000	645,000,000	642,000,000	510,000,000
Industry, Utility, Defense**	594,000,000	966,000,000	672,000,000	775,000,000	663,000,000
Storage in Structures	342,000,000	507,000,000	512,000,000	616,000,000	584,000,000
Special Structures	100,000,000	108,000,000	131,000,000	106,000,000	162,000,000
TOTAL STRUCTURE LOSS	$4,022,000,000	$4,964,000,000	$5,454,000,000	$5,976,000,000	$5,731,000,000
Outside Fires (with value)	32,000,000	38,000,000	61,000,000	61,000,000	52,000,000
Vehicles***	391,000,000	682,000,000	685,000,000	594,000,000	591,000,000
All Other	53,000,000	66,000,000	54,000,000	45,000,000	58,000,000
TOTAL PROPERTY LOSS	$4,498,000,000	$5,750,000,000	$6,254,000,000	$6,676,000,000	$6,432,000,000

Estimates are based on data reported to the NFPA by public fire departments that responded to the NFPA's Annual Survey of Fire Departments for U.S. Fire Experience (1978-1982); minor adjustments were made based on data reported to the NFPA in the FIDO (Fire Incident Data Organization) System. Dollar loss figures represent direct property loss only (loss to contents, structure, a vehicle, machinery, vegetation or anything else involved in a fire), and do not include indirect losses (e.g., business interruption or temporary shelter costs). Dollar loss estimates are based on figures reported by departments for a year, and no adjustments were made for inflation over the five year period.

*Includes mobile homes.

**Since some incidents for these property uses were handled only by private fire brigades or fixed suppression systems and were not reported to the NFPA, the results represent only a portion of U.S. fire experience.

***This category includes highway vehicles, trains, boats, ships, aircraft, farm vehicles, and construction vehicles.

Fire Experience of Large Cities

(Note: This section is based on a recently completed study, *Statistical Abstract of Fire Experience For Large Cities*, which was prepared by the Federal Emergency Management Agency (FEMA). The major objective of the study was to display the fire experience of U.S. cities with populations greater than 50,000. The data for the study was based primarily on the NFPA Annual Sample Survey for U.S. Fire Experience and FEMA's National Fire Incident Reporting System. Because of severe time limitations faced by FEMA to complete the study, editing of the data was not as complete as desired, and hence some errors may still remain, but for the most part the data is believed accurate.

The complete report *Statistical Abstract of Fire Experience for Large Cities* by FEMA is planned for publication at a future date, and will be available from the National Technical Information Service. The complete report contains 139 entries for each city greater than 100,000. The abridged results presented here include 29 entries for cities with populations greater than 100,000 and focus on total fire losses and residential losses; no results are included here for cities with populations of 50,000 to 99,999. The following includes portions and condensations of the FEMA report as applicable to the selected results presented here.)

Introduction

United States fire statistics in the past have generally emphasized the overall aggregated characteristics of the nation's fire experience. For some time, however, there has been a need for detailed statistics on the experience of individual fire departments. Such statistics can focus on the most serious fire problems, an important first step toward achieving reductions in the nation's fires, casualties, and property loss.

This *Statistical Abstract* summarizes the fire experience of U.S. cities with populations greater than 50,000. It presents a record of fires and losses over several years, thereby providing a measure of average activity and also an indication of change. This data should enable a city to compare its fire experience with other similar cities, and perhaps to identify those areas that need improvement. However, caution must be exercised in drawing conclusions from direct comparisons between cities due to the numerous factors that affect fire, casualty, and loss rates. (NFPA staff note: In particular, the fire problem for a city is often best examined in terms of high and low fire risk areas of a city and how these may change over time. Socioeconomic factors that relate to high and low fire risk areas within a city have been well-studied, [1-6] as well as the relationship of certain demographics to fire cause.[7,8])

Data Sources

One source of data used in the *Statistical Abstract* was the annual NFPA *National Fire Experience Sample Survey* of fire departments. This survey is mailed to all cities greater than 100,000 population, and to about half the cities with populations between 50,000 and 100,000. A second data source was the National Fire Incident Reporting System (NFIRS). For those cities participating, the NFIRS data was used when NFPA data was unavailable, either for an entire year or to fill missing entries. It is important to note that for many fire departments, NFIRS data tapes do not contain reports on all fires attended. In such cases, the NFIRS data will not provide accurate estimates of fires, casualties, or dollar loss. In most cases the NFIRS data was used only when it was judged that at least 90 percent of the incidents were included. A third source of data (occasionally used) was the responses to the Fire Department Characteristics Study conducted by Economic and Engineering Research, Inc. (EER) under a contract with FEMA/USFA. An EER questionnaire was sent to fire departments in twelve NFIRS states, and provided fire information primarily on total fires attended and total losses.

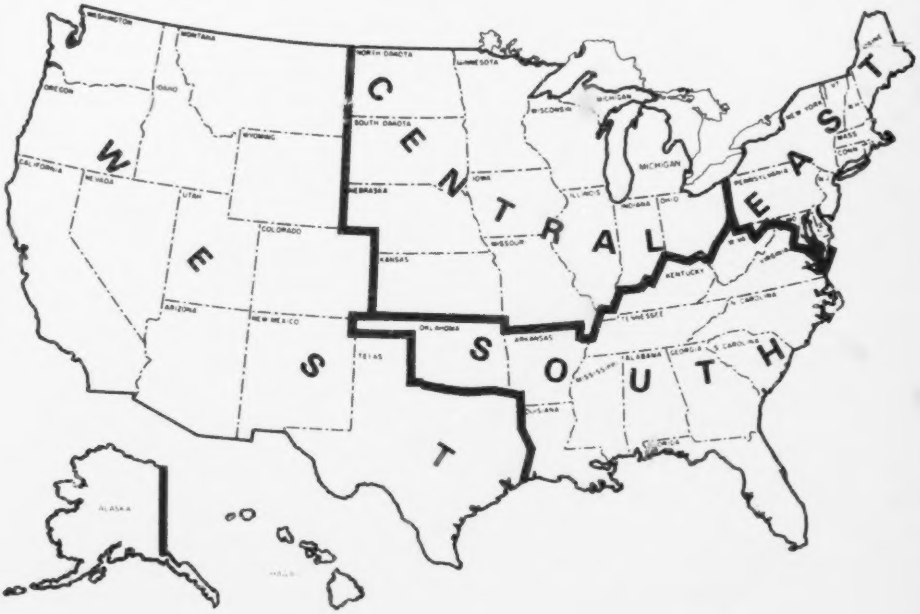
When the data from the three sources did not agree, which occurred frequently, the largest value was usually selected since under-counting is by far a more serious problem than over-counting. One undesirable feature in mixing data sources for the same year is that the detailed breakdown of fires and losses may not properly sum to the subtotal and total values.

The NFPA and NFIRS data were combined on a detailed worksheet and mailed to practically all cities greater than 100,000, asking them to verify the data and supply missing information. More than half the cities responded.

Organization of Tables

In order to facilitate more meaningful comparisons, the cities have been divided geographically into four regions — East (or Northeast), Central (or North Central), South, and West — as shown on the map. The least homogeneous region is the West, which extends over a wide geographical area with large variations in climate.

U.S. REGIONS


WEST
CENTRAL
SOUTH
EAST
WASHINGTON
MONTANA
OREGON
IDAHO
WYOMING
CALIFORNIA
NEVADA
UTAH
COLORADO
ARIZONA
NEW MEXICO
NORTH DAKOTA
MINNESOTA
SOUTH DAKOTA
WISCONSIN
MICHIGAN
NEBRASKA
IOWA
ILLINOIS
INDIANA
OHIO
KANSAS
MISSOURI
OKLAHOMA
ARKANSAS
TEXAS
LOUISIANA
MISSISSIPPI
ALABAMA
GEORGIA
S. CAROLINA
N. CAROLINA
TENNESSEE
KENTUCKY
FLORIDA
PENNSYLVANIA
NEW YORK
MAINE
MASS
CONN
ALASKA

The complete FEMA report contains 139 entries for each city greater than 100,000 population. The selected results presented here include 29 entries for cities with populations greater than 100,000 and focus on total fire losses and residential fire losses. The tables summarize fire experience for cities greater than 100,000 by region. In all, data is presented for 169 cities with populations of 100,000 or more.

Explanation of Column Headings

In lieu of providing extensive footnotes for the tables, this section explains the column headings, and defines the special symbols. Some explanatory remarks are also included.

Total Fire Losses

Col. 1 contains the 1980 Census population of the city.

Col. 2 contains the fire department's stated population protected which includes persons residing outside the city, for the most recent year of the NFPA survey. The symbol " indicates that only the population within the city is protected, which for 1980 is the number in Col. 1.

Col. 3 shows the data years. The numbers refer to the last digit of the three most recent years for which data is presented. These define the years denoted in subsequent columns by Y1, Y2 and Y3. (The symbol + denotes that a substantial portion of the data was furnished directly by the fire department.) If the NFIRS data alone was used in a certain year the digit is underlined; if both NFIRS and NFPA data were used, a "symbol is used; otherwise only NFPA data was used. For example, 1 9"7 means that the most recent year (Y1) is 1981 and NFIRS data alone was used; the next year's available data (Y2) was for 1979 and a combination of NFIRS and NFPA data was used; and the third year's available data (Y3) was 1977 and only NFPA survey data was used.

Cols. 4-6 contain the total number of fire incidents. Y1 - Y3 refer to the three years of data, in the order specified in Col. 3. A value of zero is denoted by a dash (-).

Col. 7 shows the fire rate expressed as the average number of fires per year per 100,000 persons, i.e., the three-year average — Col. 4 plus Col. 5 plus Col. 6 divided by 3 — divided by Col. 2 (times 100,000). If only two years data were available, the two-year average — Col. 4 plus Col. 5 divided by 2 — is used. Rates are the most useful measure for comparing fire experience for cities of different sizes. Rates for injuries, deaths, and property loss are not shown but could be calculated similarly.

Cols. 8-10 contain the property loss for each year in thousands of dollars.

Cols. 11-16 contain the number of injuries or deaths in each year.

Residential Fire Losses

Cols. 33-45 are similar to Cols. 4-16. The principal residential categories are: dwellings (one- and two-family) and mobile homes; apartments; hotels and motels; and rooming houses, dormitories, and miscellaneous.

References

[1] Hall, John R., Jr., and Karter, Michael J., Jr., "Fire Rates vs. Community Characteristics: Supplemental Technical Report," Washington, Urban Institute, 1976.

[2] Schaenman, Philip S., *et al.*, *Procedures for Improving the Measurement of Local Fire Protection Effectiveness*, Boston: National Fire Protection Association and Urban Institute, 1974.

[3] Karter, Michael J., Jr., and Donner, Allen, "The Effect of Demographics on Fire Rates," *Fire Journal*, Vol. 72, No. 1, January 1978, p. 53.

[4] *Community Characteristics and the Incidence of Fire: An Empirical Analysis*, Princeton: Princeton University, 1977.

[5] *Residential Fires and Urban Neighborhoods: An Empirical Analysis of Charlotte, North Carolina*, Princeton: Princeton University, 1977.

[6] *Baton Rouge Fire Household Survey*, Sunbelt Research Corporation, 1979.

[7] Gunther, Paul, "Fire Cause Patterns for Different Socioeconomic Neighborhoods in Toledo, Ohio," *Fire Journal*, Vol. 75, No. 3, May 1981, p. 52.

[8] *Neighborhood Analysis of Fire Causes: A Case Study of Toledo, Ohio*, Washington: Federal Emergency Management Agency, U.S. Fire Administration, 1981.

FIRE LOSSES FOR CITIES GREATER THAN 100,000

CITY	POPULATION		Years Data	TOTAL							
	City (Census 1980)	Total Pop'n Prot'd		FIRES				LOSS 000)			INJ
				Y1	Y2	Y3	Rate	Y1	Y2	Y3	Y1
	1	2	3	4	5	6	7	8	9	10	11
MASSACHUSETTS											
Boston	562 994	"	1+0 9	15190	18977	18690	3130	20569	19587		805
Worcester	161 799	"	0 8 7	5516	5418	3920	3060	2997			
Springfield	152 319	"	0 8 7	4366	5182	3207	2791			4134	
CONNECTICUT											
Bridgeport	142 546	"	1+0+9	6922	5881	6092	4418	5343	4928	5145	46
Hartford	136 400	"	1"0"9	3657	4028	4944	3084	2417	-	2423	33
New Haven	126 109	"	1 0 9	4232	4399	4256	3406	2927	4690	3084	37
Waterbury	103 266	"	1 0 9		3285	2120	2617	1976	2843	2437	
Stamford	102 453	60000	0 9	1514	1450		2470				
RHODE ISLAND											
Providence	156 804	"	1	5272			3369				
NEW YORK											
New York	7071 639	"	1+0+9	122261	127876	114370	1718				
Buffalo	357 870	"	1 0 9	6603	6370		1813	15967	11912	11174	40
Rochester	241 741	"	1 0 8	2967	2444	3510	1230				
Yonkers	195 351	"	1 0 9	4264	3447	4189	2030	9806	4633		32
Syracuse	170 105	"	1 9 8	2230	2291	2275	1332	5778			101
Albany	101 727	"	1 0 9	1510	1071		1269		3394		
PENNSYLVANIA											
Philadelphia	1688 210	"	1+0 9	25324	27348	22944	1493				368
Pittsburgh	423 938	"	1 0 7	7738		4818	1481				57
Erie	119 123	"	7	2399			2014	840			
Allentown	103 758	"	1+0+		2044		1970	2529	2472		26
NEW JERSEY											
Newark	329 248	"	1 0 9	7566	7393	6603	2183				
Jersey City	223 532	"	1 0 9		7874	8408	1225				94
Paterson	137 970	"	1 0 9			1853	1343	4000	5400	4063	
Elizabeth	106 201	"	9 8	1873	1488		1582				
MARYLAND											
Baltimore	786 775	"	1 0 9	11818	13782	10494	1529		11620		176
DIST OF COL.	637 651	"	1+0 9	9571	9843	7601	1412	10096	9843	10426	280

POPULATION (EAST REGION)

					TOTAL RESIDENTIAL												
URIES		DEATHS			FIRES				LOSS (000)			INJURIES			DEATHS		
Y2	Y3	Y1	Y2	Y3	Y1	Y2	Y3	Rate	Y1	Y2	Y3	Y1	Y2	Y3	Y1	Y2	Y3
12	13	14	15	16	33	34	35	36	37	38	39	40	41	42	43	44	45
107	204	28	17	24	2732	1097	951	283	9668	6495	6221	240	94	187	27	17	21
	41	10	4		360	336	557	258									
47	38	12	6	3													
33		8	2	1	1404	1404	1621	1036	3195	2001		41	25		8	2	1
10	11	6	8	6	418	519	484	347	1772	1317		30	10	8	4	7	4
31	27	4	9	7	311	292	212	215	2094	2104	1943	30	30	27	4	8	7
42	31	3	5	5		420		407	1438				30	25	3	5	5
		4			922			588							3		
	476	246	289	244	31156	32179	31504	447							213	253	208
51	64	10	16	22	1782	1809	1795	502	5884	4747	4877	40	51	64	12	14	22
		14		10	1029	1255	1146	473							14		10
18		7	3	6	181	234		106	2405	2593		23	14		6	2	
80	61	13	10	11	999	727	445	425	4545	964		77	53	54	13	10	11
36	11	8	2		320	248	290	281		1464	851		35	11	5	7	2
		78	83	106	4235	4500	4078	253							75	83	96
		13		14	1162			274	3630			43			13		
		1			1290			1083							1		
59		-	6		233	387		299	1500						-	6	
		26		37	1727	1433	1842	506							25		37
145	113	30	16	24	3272	3338	3524	611						113			24
	39	16	4	12	508	446	350	315							16	2	11
			4		383	396		367								4	
174	197	29	51	41	3614	4051	2896	447					139	173		45	37
130	186	29	28	48	1352	1960	2176	287	4316	6373	4904		106	160		28	34

FIRE LOSSES FOR CITIES GREATER THAN 100,000

CITY	POPULATION		Years Data	TOTAL						
	City (Census 1980)	Total Pop'n Prot'd		FIRES				LOSS (000)		
				Y1	Y2	Y3	Rate	Y1	Y2	Y3
	1	2	3	4	5	6	7	8	9	10
OHIO										
Cleveland	573 822	"	1"0+9	8546	8638	9874	1572	15236	17649	15796
Columbus	564 871	"	1+0+9	5919	5846	5413	1014	9256	15712	8500
Cincinnati	385 457	"	1"0"9	4025	4039	4508	1087	5802	11565	6707
Toledo	354 635	"	1+0 9	4012	4599	5036	1283	9901	10080	12872
Akron	237 177	"	1"0+9"	2114	2214	2489	958	10552	3824	4382
Dayton	203 371	"	1 0 9	2569	2891	2965	1381		4064	
Youngstown	115 436	"	1 0 9	942	2303	1892	1483	2512	2281	
INDIANA										
Indianapolis	700 807	"	1 0 9	8311	10727	3939	1093			3835
Fort Wayne	172 196	"	1 0 9	1803	2132	2125	1173	2210		
Gary	151 953	"	1+0+9	2442	2473	2770	1686	2237	2305	3973
Evansville	143 300	"	1+0+9	2470	2570	1990	1635	4783	3659	3873
South Bend	109 727	"	1 0 7	2142	2073	2857	2148	1158	1905	632
ILLINOIS										
Chicago	3005 072	"	1 0 9	50238			1672			
Rockford	139 712	"	1	1886			1350	2818		
Peoria	124 160	144000	1+0+9	544	612	716	433	3342	2460	2028
MICHIGAN										
Detroit	1203 339	"	0 9 8	18051			1500	33937		
Grand Rapids	181 843	"	1"0"9	1561	1512		845	3329	3463	
Warren	161 134	"	1"0"9"	1159	1216	1499	801	2916	2721	4123
Flint	159 611	"	1 0"9"	1356	1259		819	3178	3145	
Lansing	130 414	"	1 0 9	798	683	3362	1238	1152	1113	
Sterling Heights	108 999	"	1"0+9	731	680	754	662	1013	944	904
Ann Arbor	107 966	"	1"0"9"	603	581	660	569	1911	1347	831
Livonia	104 814	"	1"0"9	815	678	458	620	1315	2835	916
WISCONSIN										
Milwaukee	636 212	"	1 0+9	5429	5615	5809	883	10522	12306	13494
Madison	170 616	"	1 0 9+	891	921	899	538	3055	2080	3032
MINNESOTA										
Minneapolis	370 951	"	1+0+9	3698	5209	4820	1233	11331	18273	15725
St. Paul	270 230	"	1+0+9	2354	2555	2352	896	4720	8255	5480
IOWA										
Des Moines	191 003	"	1 0 9	2029	2286	2201	1137	3857	3100	5492
Cedar Rapids	110 243	"	1+0+9	2312	2336	2365	2120	2269	1628	1323
Davenport	103 264	"	1"0 9"	969	1019		963	826	846	801
NEBRASKA										
Omaha	314 255	333083	1 0+	3276	3326		991	536	5166	
Lincoln	171 932	"	1+0 9	937	1005	2256	814	1558	2756	932
MISSOURI										
St. Louis	453 085	"	1 0 9	9778	11033	10822	2327			
Kansas City	448 159	"	1+0+9	8305	7587	6925	1697	13135	10500	12393
Springfield	133 116	"	0 9 8	1188		1071	849	4455		2217
Independence	111 806	"	0 9 8	1159		1091	1006	2884		2241
KANSAS										
Wichita	279 272	"	1"0 9	2328	2667	2212	866	5117	3872	2262
Kansas City	161 087	"	1"0 9	3015	3663	2392	1877	3121	4837	2182
Topeka	115 266	"	1 0 9	1035	1274	2342	1345	3248	2397	

POPULATION (CENTRAL REGION)

						TOTAL RESIDENTIAL															
INJURIES			DEATHS			FIRES				LOSS (000)			INJURIES			DEATHS		
Y1	Y2	Y3	Y1	Y2	Y3	Y1	Y2	Y3	Rate	Y1	Y2	Y3	Y1	Y2	Y3	Y1	Y2	Y3
11	12	13	14	15	16	33	34	35	36	37	38	39	40	41	42	43	44	45
288	250	233	40	60	32	1283	1494	1547	251	5472	6047	5606	177	107	162	32	36	40
178	110		16	19	10	1627	1616	1636	288	3909	4816	3449		136	134	13	16	9
85	98	103	16	17	20	1399	1401	1519	373	3627	4275	2684	72	64	76	13	14	18
229			16	6	13	967	1201	1237	320	3291	4145	3289	73	53	95	13	6	13
97	53	95	5	17	14	543	640	627	254	1707	2070	1676	97	53		5	15	14
56	59	160	12	10	21	752	768	861	390	1934	1628	1692	46	40		5	10	19
26	14		6	13		246	167	199	177	1311	871	833	25	10	16	6	11	6
	156	202	16	14	14	1220	2385	1465	241			2220		156	162		13	14
51			3			650	741	755	415							3	7	
4	19	33	1	7	9	743	838	993	565									
13	16	21	8	3	4			561	391			1454	13	16	16	8	3	4
27	20	12	2	7	6	349	931		583	411	1506		25	19		2	7	
			170	186	183	8977			299							156	176	171
19			4			382			273	1683			11					4
40			10	5	2	227	309	282	189	1342	1772	1005				10	5	2
224			59			5025	5224	4573	411	14822	15990	10137	151	145	153	49	50	30
29	42		5	5		395	468	421	235	1859	1864	1370	19	36	23	5	3	4
22	12	30	3	-	1	156	140	199	102	1152	751	677	13	9	13	1	-	1
14	25		6	5		458	435	448	280	2151	1934	1672	14	19	27	6	5	2
20	33		1	3	2	236	237	250	185	780	804	1122	16	25	14	1	3	2
13	9	10	2	1	1	141	118	129	119	692	453	506	13	7	7	2	1	1
22	26	14	1	-	2	148	159	160	144	985	805	452	17	23	14	1	-	2
6	8	7	-	1	1	67	76	74	69	604	588	359	4	8	4	-	1	1
			18	17	17	1560	1587	1554	246	6528	5958	5858				17	17	17
32	30	43	2	3	2	299	312	271	172	943	1517	1056	25	21	28	2	3	-
39	72	73	5	21	18	1035	1800	1695	407	6750	6077	5037	35	59	59	4	16	18
32	25	42	3	2	4	600	424	506	189	1857	2850	1645	24	24	29	3	1	3
	19	52	3	6	8	376	486	505	239	2241	1721	2209		10	49	3	4	11
20			2	-	-		448	472	417	634	905	880	16			2	-	-
6	18	10	1	1	1	191	193	142	170	499	383	477	5	9	8	1	1	1
53	45		8	3		745	686		215				35	26		6	3	
15	14	18	-	1	-	214	198	673	210	736	692	652	7	3	14	-	-	-
		114		24	27	2223	2644	2649	553						95		24	26
119	57		37	17	20	1341	1427	1476	316	7486	5889	6458	119			34	16	18
11		27	2		3	244	253	353	213	947	1311	1375	6	9		2	-	2
12		4	2		2	237	208	356	239	1571	879	865	3	4	3	2	1	2
85	77	96	10	6	17	570	557	531	198	1991	1868	1087	62	51	61	8	6	17
21	36		3	13	4	570	594	436	331	1654	2300	1013	12	36		3	12	4
21	30	24	5	8	5	256	287	404	274	689	862	2068	13	28	17	5	8	5

FIRE LOSSES FOR CITIES GREATER THAN 100,000

CITY	POPULATION		Years Data	TOTAL						
	City (Census 1980)	Total Pop'n Prot'd		FIRES				LOSS (000)		
				Y1	Y2	Y3	Rate	Y1	Y2	Y3
	1	2	3	4	5	6	7	8	9	10
VIRGINIA										
Norfolk	266 979	-	1 0 8	2726	2778	2591	1011			
Virginia Beach	262 199	-	1+0+9	3167	3080	2905	1143	3569	5084	4826
Richmond	219 214	-	1+0+9	2846	3167	3091	1384	4118	6784	3091
Newport News	144 903	-	1+	2167			1495	2880		
Hampton	122 617	-	1 8 7	1171	951	1439	979	1822	1100	1476
Chesapeake	114 486	-	1+0 9	1546	1352	1477	1274	1689		1347
Portsmouth	104 577	-	1 9 8	1239	1420	1317	1267	1457	1376	
Alexandria	103 217	-	1 0 8	828	857	904	836	3670	1037	2064
Roanoke	100 220	-	0 9 8	1399	1450	1360	1400	3771		
KENTUCKY										
Louisville	298 451	-	0 9 8	4372	4488	4655	1509			
Lexington-Fayette	204 165	-	1+0+9	4363	3908	2793	1806	4900	4200	2500
TENNESSEE										
Memphis	646 356	-	1 0 8			13962	2160	16877	21135	15890
Nashville-Davidson	455 651	-	0 9 7	5645		5334	1205			
Knoxville	183 139	-	1+0+9	2094	2246	2123	1176	3460	5469	
Chattanooga	169 565	-	1+0+9	4448	4638	4292	2630			
NORTH CAROLINA										
Charlotte	314 447	-	1 9 8	3627	3126	2824	1015	7516	8195	6654
Greensboro	155 642	-	1 0 9	1447	1324	1173	845	2779	2453	2845
Raleigh	149 771	-	1 0 9		1889		1261	1418	3123	
Winston-Salem	131 885	-	1 0 9	1898	1575	1327	1213	9059	5241	3500
Durham	100 831	-	1+0+9	1089	1126	1126	1104	1765	1869	3247
SOUTH CAROLINA										
Columbia	101 208	300000	1+0+9	3482	3066	3327	1097			
GEORGIA										
Atlanta	425 022	-	1+0+9	6020	6055	6062	1422	19487	12404	14812
Columbus	169 441	-	1+0 9	2030	1825	1825	1113	3917	1781	1904
Savannah	141 390	-	1+0+9	1780	1571	1679	1186	4268	2282	4174
Macon	116 896	150815	1 7	2767	2412		1717		4095	
ALABAMA										
Birmingham	284 413	-	1+0+9	4190	3780	3619	1358	12930	8712	8132
Mobile	200 452	-	1+0+9	3560	3303	3489	1721		2373	
Montgomery	178 157	-	0 9 7	1531		1719	912	2661	2713	2243
Huntsville	142 513	-	1 9 7	1406	1530	1786	1104	4225		
MISSISSIPPI										
Jackson	202 895	-	1+0+9	3965	2655	2809	1549	5068	6429	4102
LOUISIANA										
New Orleans	557 482	-	1+0+9	5918	5178	5479	991	14046	42926	19474
Baton Rouge	219 486	-	1+0 9		1499	1552	695	7737	4358	3970
Shreveport	205 815	-	1 0 9	2871	3047		144	7164	3303	
ARKANSAS										
Little Rock	158 461	-	1 0 9	2492			1573		8453	3876
OKLAHOMA										
Oklahoma City	410 251	-	0 9 8	6962			1697	16804		
Tulsa	360 919	-	1 9 8	3685	6848	6618	1584	12393		7796
FLORIDA										
Jacksonville	540 920	-	1+0+9	7105	5965	6063	1179		8067	8749
Miami	346 865	-	1+0 9	1773	1763	3123	640	10599	10640	8872
Tampa	271 523	-	1 0 9	3865	3039	2907	1204	7352	6396	5060
St. Petersburg	238 647	-	1+0+9	2031	1917	2232	863	3068	2247	3138
Fort Lauderdale	153 279	-	1 0 8	1576		1339	951	6981		2651
Hialeah	145 254		1+0 9	896	858	870	602	1166	1529	793
Orlando	128 291	-	1+0 9	1888	1517	1270	1215	1673	1955	1062
Hollywood	121 323	-	1+0 9	723	1033	1046	770	4864	2352	1185

POPULATION (SOUTH REGION)

INJURIES			DEATH			TOTAL RESIDENTIAL												
						FIRES				LOSS (000)			INJURIES			DEATHS		
Y1	Y2	Y3	Y1	Y2	Y3	Y1	Y2	Y3	Rate	Y1	Y2	Y3	Y1	Y2	Y3	Y1	Y2	Y3
11	12	13	4	5	6	33	34	35	36	37	38	39	40	41	42	43	44	45
36	44	80	11	10	12	800	797	690	286				36	40		8	10	
53	46	64	1	4	9	611	579	615	225	2808	2277	2877				1	4	9
72	50	81	20	15	16	879	1191	1089	480	1722		1016	21	50	34	20	15	16
			6															
21	5	12	1	10	4	295	246	252	216	1065	651	619	18	5	12	1	4	4
20	30	25	3	2	2	390	278	412	314	813	819		18			2		
21	36	20	5	8	5	530	524	389	460	926	1253	340	21	36	16	4	6	5
	38	22	-	-	3	158	167	218	175	735	7398	885		38	22	-	-	3
			3	4	4	175	203	416	264							2	3	3
148	110	168	14	6	15	1491	1293	1466	475				134	105		13	5	13
48	29	46	4	-	10													
	83	177		20	20									54	112		17	20
		12	7		18	670	644	740	150	5301	4164	3452		13	7	7	11	14
15	27	27	1	7	4	323	346	382	191									
24	22	18	7	7	4	514	423	606	303				20	15	15	6	6	4
	52	67	11	7	12	785	880	774	259	2963	2264					10	6	11
25	22	26	10	1	2	368	246	239	183	1668	1253	1254	22	18	20	8	1	2
8			4	-	2		747	534	178		1949	1353	6			3	-	2
27	30	29	5	5	5	495	376	322	302	1979	4217	1456	27	22	24	5	5	5
65	60	76	6	5	6	312	353	374	343	850	676	1407	35	49	64	4	4	3
63	57	52	8	9	4													
135	103	134	31	32	26	1209	1316	1394	307	10807	6377	10817	63	49	106	27	25	23
86	28	27	5	8	5	489	545	594	321	1532	1450	1402	65	24	27	5	8	5
			6	4	5	457	484	498	339	1387	943	1431				6	4	5
	6		13	18		741	741		491	2292	2291		6	6			17	
34	34	34	18	26	30								23				25	
			7	10	4	566	635		300	1765	1314					3	8	
22	35	52	3	4	8	417	386	487	241	1171	969		13	35		2	4	
16	10	17	10	5	5	649	563	556	414				10	8	17	3	5	5
16	6	2	10	8	7	909	808	740	404				16	6	2	10	8	7
91	107	48	25	24	19	1961	1740	1468	309	5923	5210	14351	63	74	45	20	23	15
19	29	18	6	3	6	380	364	366	169	4541	2357	2026		14	10	6	3	5
			6	8		980	829	730	411	2598	2114	1138			24	6	8	4
			4	8	7	803	686		470								7	
			19	20	23	1371		1130	305	476	5592					17	19	21
68	16	14	15	11	15	897	1368	2115	405	6685		5778	40	12	14	14	11	15
58	53	76	9	24	27	1276	1081	1418	233	6725	4784	4209		53			23	
87	105	74	14	8	9	686	659	777	204	1731	1227	1010	45	45	44	10	6	7
35	34	17	15	11	11	535	480	500	186	3166	2109	2076	28	21	15	14	11	9
57	38	59	10	4	4	480	626	698	252	1572	1709	1614	39	33	42	9	4	4
61		88	6	1	-	389		371	248	2285		712	44		61		-	-
21	17	44	-	-	1	233	244	283	174	427	418	305	15	7	36	-	-	-
30	50	31	5	3	2	457	467	219	297	869	1213	534	20	50	31	5	3	2
42	26	35	5	-	2	118	287	288	190	895	770	598	26	15	24	5	-	2

FIRE LOSSES FOR CITIES GREATER THAN 100,000

CITY	POPULATION		Years Data	TOTAL						
				FIRES				LOSS (000)		
	City (Census 1980)	Total Pop'n Prot'd		Y1	Y2	Y3	Rate	Y1	Y2	Y3
	1	2	3	4	5	6	7	8	9	10
TEXAS										
Houston	1595 138	-	1+0+8	14344	13773	13836	877	53942	28590	61512
Dallas	904 078	-	1+0+9	10240			1133			
San Antonio	785 880	-	1+0+9	9538	11449	10765	1348	9436	14825	17426
El Paso	425 259	-	1 0 9	4239	3565		918			1469
Fort Worth	385 164	-	1 0 9	6738	9356	5285	1850		13759	
Austin	349 496	-	1 0 8	2790	3740	7522	1356	5277		3909
Corpus Christi	231 999	-	1+0+9	2495	2895	3009	1207			2144
Lubbock	173 979	-	1+0+9	2676	3141	3126	1713	1655	1258	1027
Arlington	160 113	-	1 0 9	1410	1851		1018	5796	2223	5556
Amarillo	149 230	-	1 0 9	1470	1867	1619	1107			
Garland	138 857	-	1 0 9	1889	2186	1886	1431	2889	3219	1967
Beaumont	118 102	-	1 0 9	1699	1674	1591	1401	3237	1306	1946
Pasadena	112 560									
Irving	109 943	-	0 8 7	1358	1362	1321	1225	6321		1889
Waco	101 261	-	7	1048			1035			
NEW MEXICO										
Albuquerque	331 767	-	0 9 8	5043	3925	3817	1285	5416	2954	4228
ARIZONA										
Phoenix	789 704	-	9 8		19076		2416	18817	6625	
Tucson	330 537	-	1+0+9	3895	3549	4732	1228	7360	6205	6238
Mesa	152 453	-	0	1157			759	1039		
Tempe	106 743	-	1+0+9	1068	1212	1403	1150	1524	3244	2477
IDAHO										
Boise City	102 451	-	1 0 9	693	729	674	682	1242	978	
NEVADA										
Las Vegas	164 674	-	9 8 7	3019	1980	2325	1483			7822
Reno	100 756	-	1+0+9	1209	1241	1152	1192	1600	4100	2470
UTAH										
Salt Lake City	163 033	-	1 0 9	1476	1965	1755	1062	2738	2675	8528
COLORADO										
Denver	492 365	-	1"0+9	6941	7565	6836	1444	4171	4675	5534
Colorado Springs	215 150	-	1+0+9	2041	1714		873	2684	2276	
Aurora	158 588	-	1+0+9	996	966	1119	648	1519	1677	1720
Lakewood	112 860	-	1 0 9	681	564	489	512	1542	1206	431
Pueblo	101 686	-	1 0 9	1091	1142	1016	1065	891	766	827
WASHINGTON										
Seattle	493 846	-	1 0 9	3952	3509	4382	799	7719	9359	8818
Spokane	171 300	-	1"0+9	1617	2982	3223	2417	5282	3626	6016
Tacoma	158 501	-	9 7		2082		1314	6490	3394	
OREGON										
Portland	366 383	373285	1"0"7	3180	3464	3227	881	9754	13071	7648
Eugene	105 624	122079	1"0"9	589	985		645	1833	1226	
ALASKA										
Anchorage	174 431	210000	1+0 9	1311	1187	1306	604	5584	3654	13038
HAWAII										
Honolulu	762 874	-	1 0 9		8749	9721	1211			

POPULATION (WEST REGION, EXCEPT CALIFORNIA)

						TOTAL RESIDENTIAL															
INJURIES			DEATH			FIRES				LOSS (000)			INJURIES			DEATHS					
Y1	Y2	Y3	Y1	Y2	Y3	Y1	Y2	Y3	Rate	Y1	Y2	Y3	Y1	Y2	Y3	Y1	Y2	Y3			
11	12	13	14	15	16	33	34	35	36	37	38	39	40	41	42	43	44	45			
319	126	164	43	39	68	3938	3823	3423	234	15570	21600	26839	214	121	126	42	33	57			
			31	24	34	2231			247	17123						28					
80	95		17	18	13	1636	2130	2307	258	4326	6011	3347	70	35		11	12	10			
52	72	57	4	2	12	528	578	496	126	654	965	712	27	53	37	4	1	12			
56	53		22	14	2	952	1795	1080	331	5244	7328	5210	42			17	12	2			
19	34	33	3	5	1	326	424	406	112	2871	2314	1726	19	31	12	3	4	1			
13	13	25	3	5	4	792	814	769	341	800	856	997	13	16	23	3	4	4			
27	33	30	6	6	8	474	605	562	314				25	10	25	5	1	7			
25	39	4	2	2	34	272	273	278	171	3905	1706	1421	15	39	2	1	2	23			
9	14		8	3		362	393	329	227		2424	1225	8	14		7	3				
		2	-	3	4	253	278	304	200	1309	1418	1584	-	-	2	-	2	4			
42	49	32	10	4	3	467	542	438	408	1196	379	389	28	29	19	10	4	3			
	44	27	2	5	1	245	157	195	181	2417	938	880				1		1			
6			2																		
46	41	46	4	3	3	457	488	957	191	2959	1368	2083	46	41	46	4	1	3			
109	70		13	15			2502		317		3634						13				
78	60	70	8	7	7	930	891	982	283	2872	2038	2248	67	32	58	7	6	4			
6			-			134			88	390			-			-					
	10		-	1	2	112	130	172	129	729	992	1812		10		-	1	2			
17	9		2	1	2	170	189	192	179	650	518	963	17	5		2	1	1			
30	40		-	10		363	350	420	229	1833		2423	16			-	6				
18	29	39	4	4	2	508		343	422												
30	40	51	6	14	6	232	208	253	142	881	1100	2700	32	36		6	14	6			
269	221	209	16	9	13	1259	1512	1505	289	1532	2547	2153	167	172	158	15	8	8			
26	21		-	3	2		380	295	157			960					3	1			
42	23	35	-	-	4	281	224	329	175	831	621	1352	41	24	28	-	-	4			
3	3	11	2	-	1	65	129	68	77	1142	271	190	3	3	11	2	-	1			
-	13	-	-	3	-	340	301	232	293	589	602	432	-	-	6	-	2	-			
124	111	153	17	26	12	1391	1066	1091	239	3588	4785	4507	83	82		13	25	10			
29			3	3	-	641	1174	1245	595	1819			21				3				
61	25		4	3		384	385		243	2224	1148					4	3				
73	72	72	15	12	14	836	1012		248					50		13	12				
7	9		4	3		191	132	171	135	642	499	298	3	8	5	-	2	-			
36	42	38	6	2	7	330	330	346	160	2057	2193	3071	35	42	33	6	2	7			
		62		9	7			401	53			5005			53		8				

FIRE LOSSES FOR CITIES GREATER THAN 100,000

CITY	POPULATION		Years Data	TOTAL						
				FIRES				LOSS (000)		
	City (Census 1980)	Total Pop'n Prot'd		Y1	Y2	Y3	Rate	Y1	Y2	Y3
	1	2	3	4	5	6	7	8	9	10
CALIFORNIA										
Los Angeles	2966 850	-	1+0+9	29296	31684	33130	1057	86524	55622	
San Diego	875 538	"	1"0"9	7125	7557	7923	861	16929	25634	11208
San Francisco	678 974	-	1"0"9	7544	8226	8691	1201	19252	18512	19249
San Jose	629 442	700000	1 0 9	4868	4745	5187	705	14633	12056	12627
Long Beach	361 334	"	1 0 9	3583	3923	4610	1118	7226	5765	
Oakland	339 337	-	1"0 9	4595	4633	4613	1360	15120		18391
Sacramento	275 741	-	1 0 9	6189	4151	7519	2159	8475	7817	6090
Anaheim	219 311	-	1 0 9	2391	2003	1976	968	2874	5263	3241
Fresno	218 202	-	1 0 9	2873	2713	2762	1275	6421	5946	5069
Santa Ana	203 713	-	1 0 9	1528	1657	1698	799	6920	4109	4091
Riverside	170 876	-	1+0+9	1294	1547	1746	895	1820	3226	2797
Huntington Beach	170 505	-	1+0+9	1014	1205	1163	661	1521	2125	2160
Stockton	161 779	"	1+0+9	2072	2124	2048	1287	5726	6082	2956
Glendale	139 060	-	1+0+9	1022	1233	1066	796	1997	4113	3356
Fremont	131 945	-	1+0+9	1061	1236	1061	848	1960	2511	
Torrance	129 881	-	1+0+9	919	902	953	712	1110	790	3552
Garden Grove	123 307	-	0"9 8	1361	1398	1568	1175	1064	2499	
Pasadena	118 550	-	1 0 9	1252	1161	1232	1025	3544	3073	4182
San Bernardino	117 490	150000	1 0 9	2091	2350	2522	1547	2761		
Oxnard	108 195	"	1"0 9	932	1098		938	1558	925	
Sunnyvale	106 618	-	1 0 9	735	701	887	726	3445	3252	1199
Modesto	106 602	"	1+0+9	1075	1119	1125	1038	1548	1697	1324
Bakersfield	105 611	-	1+0 9	1616	1608	1628	1531	2154	3202	4724
Berkeley	103 328	-	1+	876			848	3960		
Fullerton	102 034	-	1+0 9	801	866	918	844	1806	1928	

POPULATION (WEST REGION—CALIFORNIA)

						TOTAL RESIDENTIAL															
INJURIES			DEATH			FIRES				LOSS (000)			INJURIES			DEATHS		
Y1	Y2	Y3	Y1	Y2	Y3	Y1	Y2	Y3	Rate	Y1	Y2	Y3	Y1	Y2	Y3	Y1	Y2	Y3
11	12	13	14	15	16	33	34	35	36	37	38	39	40	41	42	43	44	45
266	272		73		89	5105	5169	5584	178	36714	19226		177	151	148	47		
116	148		7	17		1229	1675	1889	182	8020	13662	6084	91	93	127	7	12	8
	58		28	12	33	2189	2363	2366	340	28723	11406	22357		32		24	7	28
92	92	118	11	7	25	869	1035	1637	169	8572	6815	7806	58	71	82	9	3	20
14	36	33	4	9	14	909	916	1455	303	2604	2160	1207	11	17	20	4	2	3
		86	14		17	1381	1410	1567	428	6531	5434	4309	25	47	45	10	5	11
33	32	36	6	8	15		872	904	322		3727	2899		25	31		8	12
	11	6	4	1	1	268	310	354	142	1415	1679	1110	31	8	6	4	1	1
44	85	49	-	10	10	652	644	548	282	2945	2155	2284	36	27	36	2	9	8
44	47	76	3	2	7	330	379	314	167	1308	1501	1233	23	28	49			4
13	19	21	5	1	3	333	377	434	223	1254	1818	970	10	8	9	4	2	1
11	11	25	1	1	7	151	194	184	103	930	917	921	4	7	15	-	-	6
9	24		2	4		413	363	343	231	2360	1879	1423	9	15	7	2	3	2
15	33	25	-	3	3	171	260	265	167	1196	1240	805	8	13	16		2	1
39	24		5	2		257	236	275	194	1046	867	526	17	14	16	1		2
	11	18	1	1	3	106	236	251	152	781	384	307		9	12	1	-	-
13	20	4	2	-	3	192	469	503	315	831	1595	1180	8	22	4			3
20	21	5	-	5	1	375	367	506	351	2297	1922	635		11	5	-	3	1
15	18	19	4	7	-	452		316	256	1423		1050		18	10	2	6	-
7	1		2	-		120	146	157	130	190	474	353	6	1	-	2	-	-
11	11	24	-	2	1	155	174	189	162	783	1056	483	3	6	14	-	1	-
24	22	28	4	1	1	282	302	272	268	582	775	938	16	17	19	3	1	1
6	15	10	3	2	1	295	266	315	276	1088	1220	2165	6	13	10	3	2	1
33			-			287			278	1739			9			-		
4	2		-	-		138		116	124	922		452			1	-		-

Causes of Fire Incidents — 1981

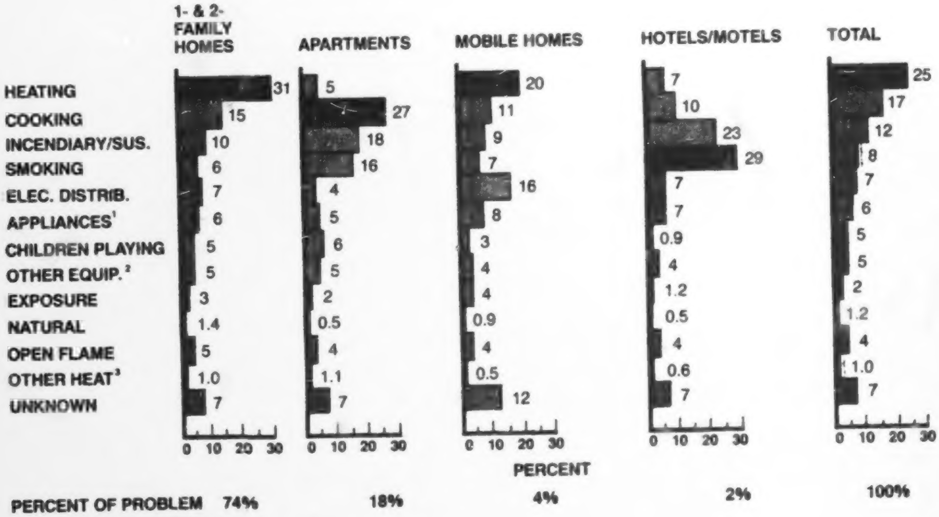
The estimates of cause of fire incidents in this section are based on data reported to the Federal Emergency Management Agency (FEMA) in its National Fire Incident Reporting System (NFIRS). (For a discussion of fire cause where a fatality occurred or where large property loss occurred, see sections on "Ignition Scenarios of One- and Two-Fatality Fires and Profiles of Fire Victims," "Multiple-Death Fires," and "Large-Loss Fires.") NFIRS 1981 fire incident causal estimates in this section are based on data reported by fire departments from 32 states which participate in the NFIRS system.

Fire cause categories used by FEMA summarize three data elements (form of heat of ignition, equipment involved in ignition, and ignition factor) specified in NFPA 901, *Uniform Coding for Fire Protection*, and reported in NFIRS data. There are four exceptions to the general rule that FEMA cause categories follow NFPA 901. These are: 1) the "Appliance" category includes air conditioners; 2) the "Other Equipment" category includes special processing, and service equipment; 3) the "Open Flame" category includes torches; and 4) the "Other Heat" category includes all remaining known categories (other than smoking) not involving equipment. (For further details about FEMA cause categories, see *Fire in the United States*, second edition, U.S. Government Printing Office, 1982, p. 15.)

The results presented here are based on cause of fire incidents by occupancy type. The identification of leading fire cause categories by occupancy type can lead to more effective planning for fire inspection and prevention efforts.

Causes of Fires in Residential Occupancies

FEMA estimates of the cause of 1981 fires in residential occupancies[1] are displayed in the figure shown below. The leading causes of fire in one- and two-family dwellings were heating (31 percent), cooking (15 percent), and incendiary or suspicious (10 percent).



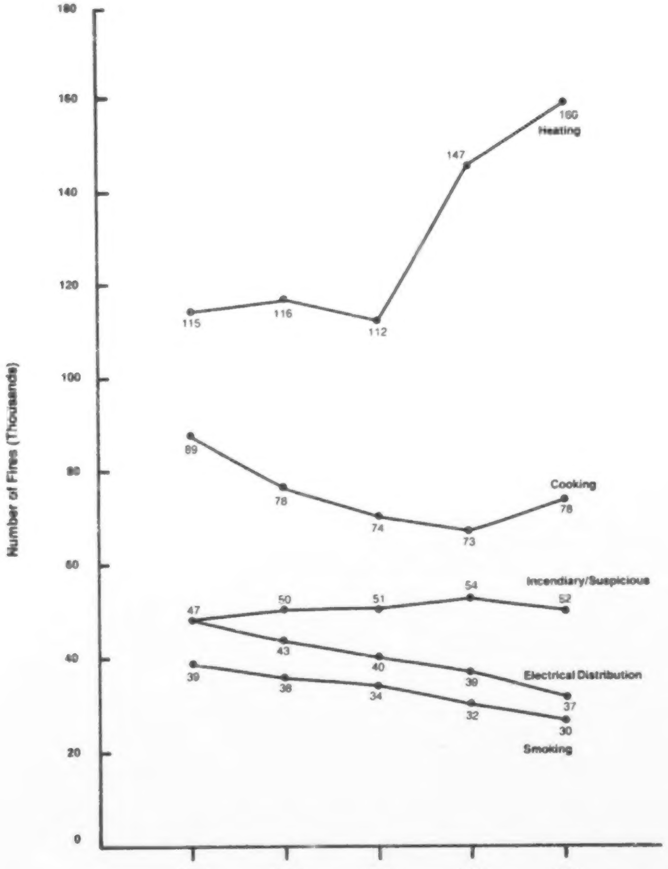
The estimates are based on NFIRS data.

[1] Includes all items listed as appliances in NFPA 901, along with air conditioners.

[2] Includes special equipment, processing equipment, and service or maintenance equipment.

[3] Includes rekindled fire, fireworks, explosives, heat or spark from friction, molten or hot material, and other heat from a spark or hot object.

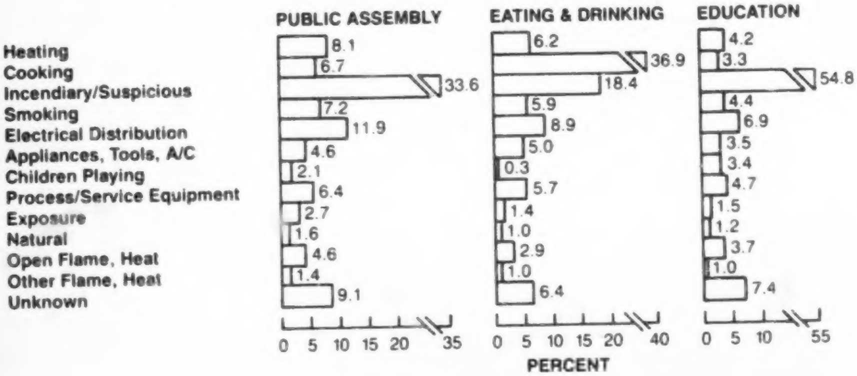
The graph below displays selected causes of fires in one- and two-family dwellings (1977-81).[2] It shows that heating and cooking fires dominate as the leading causes of fires in one- and two-family dwellings over the five-year period. Heating fires in particular increased considerably in 1980 and 1981.

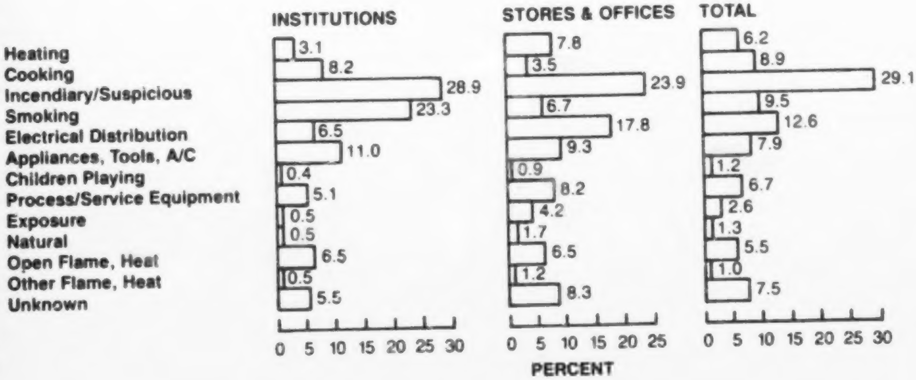


Based on FEMA analysis of NFPA's National Fire Experience Survey and NFIRS data.

Causes of Fires in Public-Mercantile Occupancies (1981)

FEMA estimates of the causes of 1981 fires in public-mercantile occupancies[3] are displayed below. Overall, incendiary or suspicious was the leading cause of fires in public-mercantile occupancies, accounting for 29.1 percent of all fires. Because the leading causes vary somewhat by property type, a different emphasis in fire inspection and prevention programs is needed for each property type.

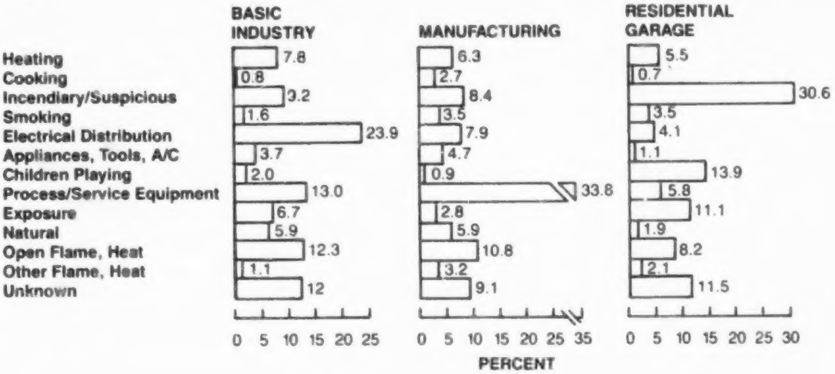


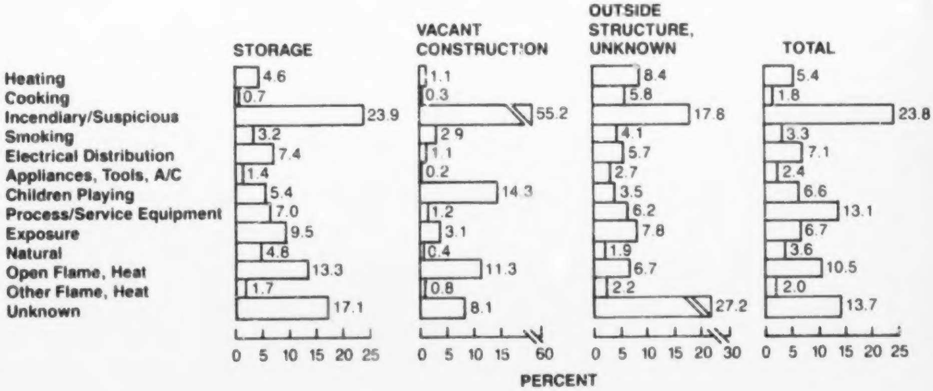


Source: FEMA—Based on 1981 NFIRS data (26,504 fires reported with 2,831 in Public Assembly; 5,037 in Eating, Drinking; 3,089 in Education; 5,015 in Institutions; 10,532 in Stores and Offices).

Causes of Fires in Industrial Occupancies (1981)

FEMA estimates of the causes of 1981 fires in industrial occupancies[4] are displayed in the graph below. Because the leading fire causes vary somewhat by property type, a different emphasis in fire inspection and prevention programs is needed for each property type.





Source: FEMA—Based on 1981 NFIRS data (40,168 fires reported with 2,046 in Basic Industry; 6,741 in Manufacuring; 8,633 in Residential Garage; 9,759 in Storage; 6,749 in Vacant, Construction; and 6,240 in Outside Structure, Unknown).

References

[1] *Fire in the United States* (4th edition), Federal Emergency Management Agency, Washington DC 20472, p. 10. Also in condensed version of report published as "A FEMA View of the 1981 U.S. Fire Problem," *Fire Journal*, Vol. 76, No. 6 (November 1982), p. 34.

[2] *Ibid.*, p. 14. Also in *Fire Journal*, Vol. 76, No. 6 (November 1982), p. 40.

[3] *Ibid.*, p. A8 (adapted from Table 7).

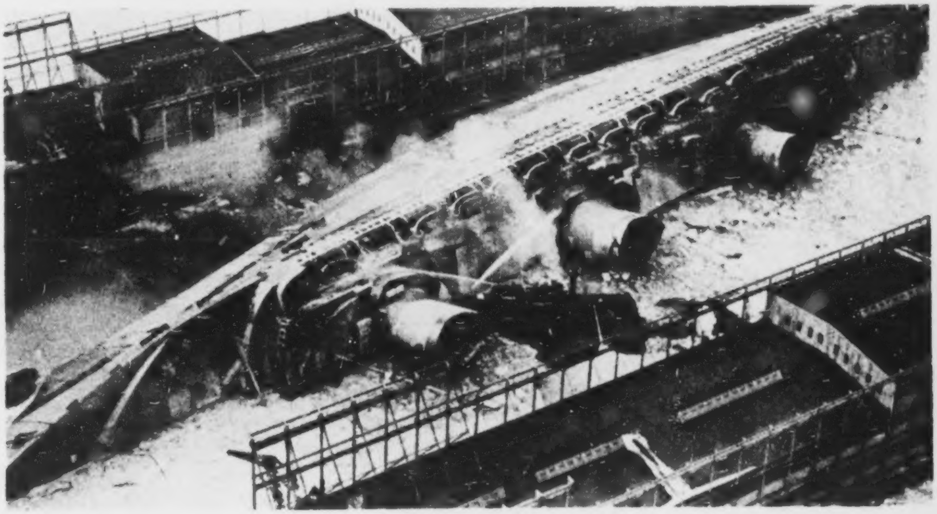
[4] *Ibid.*, p. A12 (adapted from Table 8).

The seating capacity of the Iroquois Theatre in Chicago was 1,625, but on the afternoon of December 30, 1903, about 1,830 persons were in the audience and 275 on stage. During the second act, hot particles of carbon from an open arc light came in contact with a border drop. The inferno which ensued caused the greatest loss of life in a theatre fire in the United States, killing 602 persons and causing 250 injuries.

On the sunny afternoon of July 6, 1944, a large circus tent in Hartford, Connecticut, was suddenly enveloped by a flash fire. The fire is believed to have started by a discarded cigarette or match. Flames spread up the side of the tent, helped by a gust of wind. Within minutes, 168 persons died, 63 of them under the age of fifteen. More than 200 persons were confined to hospitals with severe burns. It was the worst tragedy ever experienced by "The Greatest Show on Earth." (Acme Photo)

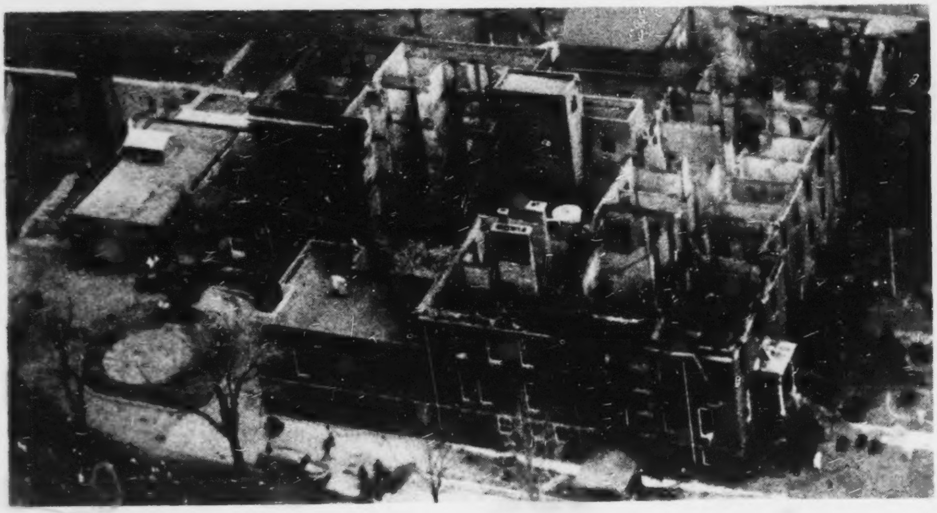
On the morning of April 16, 1947, longshore workers in Texas City, Texas, discovered fire in a hold of the *S. S. Grandcamp*, a former Liberty ship which had a cargo of ammonium nitrate. At 9:15 a.m., a tremendous explosion killed 26 of the 27 fire fighters on duty and totally destroyed their four fire trucks. A total of three ships were sunk. A second explosion occurred aboard the *S. S. High Flyer*, docked in a separate slip, blowing it across the slip into the *S. S. Keene* shown here. Before the fire was out, 468 people perished.

On February 9, 1942, the *USS Lafayette* (formerly the French luxury liner *Normandie*) caught fire while being converted to a troop carrier for use in World War II. The New York City Fire Department poured nearly a million gallons of water into the liner trying to halt the blaze. With the harbor choked with ice, the graceful liner rolled over and died. She was later cut up for scrap. (International News Photos)



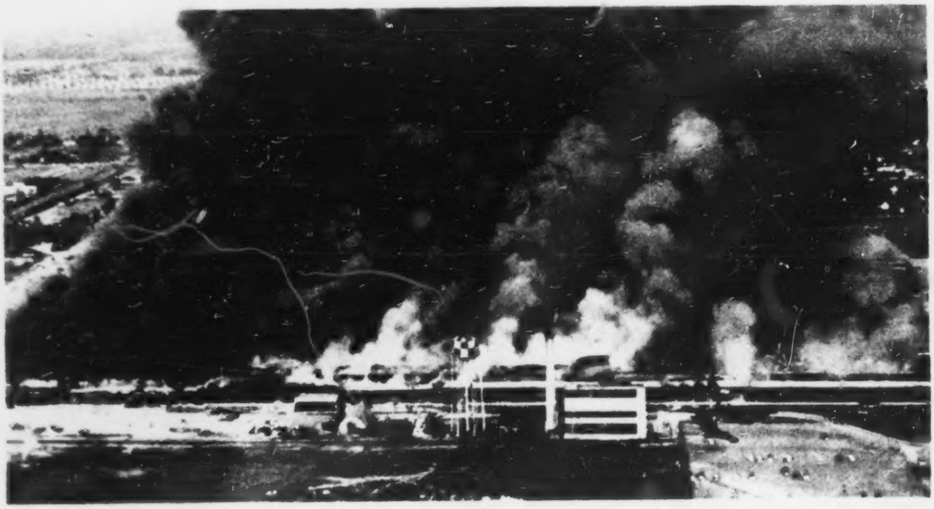
On December 7, 1946, a fire in the Winecoff Hotel in Atlanta, Georgia, took the lives of 119 persons. In this view of one of the seared rooms, nothing was left untouched. The most horrible part of this tragedy was the number of persons who jumped from windows or fell from the building. Several fire fighters were injured when struck by some of the panicked victims, and fire department ladders were broken by falling bodies. (Marion Johnson, International News Photos)

On May 25, 1950, in Chicago, at least 34 persons were killed and 50 more injured by flaming fuel which was sprayed on them when the gasoline truck (foreground) collided with a crowded streetcar (background). In addition, more than 50 families were made homeless as the flames engulfed five nearby buildings. (Acme Photo)



It was almost midnight on April 4, 1949, when a rapidly spreading fire in St. Anthony's Hospital in Effingham, Illinois, killed 74 patients and injured many others. Among the fatalities were 11 newly born infants. Fern Riley, a young nurse overseeing the second floor nursery, could have escaped during the early stages of the fire by stepping outside the window of the nursery to safety, but died with her "babies" facing certain death. Fire fighters and nuns fought heroically to save lives and extinguish the fire.

On August 12, 1953, the Hydra-Matic automatic transmission plant at the General Motors Corporation in Livonia, Michigan, was destroyed by fire, killing three trapped employees and injuring 15 others. A fire fighter suffered a fatal heart attack and two members of a construction crew were electrocuted several days later while clearing debris. This was the only plant making automatic transmissions for Cadillac, Oldsmobile, Pontiac, Nash, Hudson, Kaiser and Lincoln automobiles. (A. P. Newsphoto).



Significant Historical Fires

Floating Inferno: Terror and Tragedy on the High Seas Revisited

by Ruth Harmon Carwile

It has been said that a case could be made that the major fires throughout history were either caused directly by human malice or malpractice, or the severity of their effects was increased by the human response to them.[1] The latter theory was tragically proved 50 years ago this year, when on September 8, 1934, crew errors and bungling on the cruise liner *S.S. Morro Castle* enabled what might have been a small, easily contained fire to rage out of control. Of the 549 passengers and crew, 135 were to lose their lives due to a madcap response to fire.

Again and again, the words cowardice, incompetence, confusion, carelessness, delay, and panic have been used in reports of the crew's handling of the disastrous fire aboard the luxury liner. The tale aboard ship is one of stark contrast: passengers in a light-hearted, relaxed holiday mood versus members of the ill-trained, disgruntled crew who hated their captain and their substandard working conditions.

During the early years of the 1930s, the *Morro Castle* sailed between New York City and Havana on a weekly round-trip luxury cruise. The cruise had the reputation for being a nonstop drinking bash, and at bargain prices was attractive to many revelers during the prohibition era. The ship itself was designed for maximum safety, speed, and luxury. It was a floating, first-class hotel that cruised not more than five to nine miles from the coast.

The naval architect, well aware that fires at sea were not unusual, took special care with fire protection. There were tubes to transmit the smell of smoke in the cargo holds to the navigating center and automatic foam extinguishing systems in the holds and engine room. An electric sensor system could pinpoint a fire in the 217 staterooms, ship's offices, or crew's quarters. There were automatic doors the full width of the ship at 130-foot intervals, and additional automatic doors in public areas. However, there were no fire detectors in the common rooms such as the library, dining room, ballroom, or writing room.

There were 42 hydrants on five decks, 2,100 feet of canvas fire hose, and over a hundred individual fire extinguishers. There were 12 lifeboats, 12 life rafts, 18 life buoys, and 850 life preservers. These provided the capacity to rescue 1,907 people, almost four times the maximum allowable number of passengers and crew on board. Why, then, did 135 people of the 549 passengers on board the evening of September 8 lose their lives?

The sequence of events that evening reads like the script of a disaster movie of the 1970s. But no playwright could ever match the real life horror that must have been felt that night. Imagine waking at 3 a.m. to feel the heat from flames against your stateroom door, sure you're having a nightmare, only to discover you're already awake. You stumble in the dark to put on some clothes and try to find your escape from the floating inferno. You reach the bridge where the crew are the only ones being lowered to safety in the lifeboats that do work. The other boats, which were supposed to be lowered to the water by the flick of a lever, are caught in their own ropes. There is no choice — you must jump from the ship into the water. With the will to live, you grab a life preserver, jump into the cold, turbulent waters in the driving rain of a northeast gale, and wait to be rescued.

Those were the lucky ones. Some who jumped did so without life preservers. If they were strong enough, they survived. But there are tales of passengers without life preservers who were turned away from lifeboats or by survivors who would not share even a shred of room on their preserver because they were so frightened. And the saddest of all were those who summoned their courage and jumped to the water below, only to be hit in the face and knocked unconscious by the hard cork of the life preserver. They drowned. Some fractured their necks and died.

One survivor, Augusta Tusrin, described the scene: "There were people screaming for help, tossed to and fro by the waves. There were bodies floating face down. People without life preservers were swimming from body to body, untying the preservers and putting them on themselves. People were hanging on to us..."[2] In his in-depth research into the *Morro Castle* tragedy, news reporter Hal Burton concluded that "Heroism, dogged courage, common sense, and surprisingly little cowardice marked those who jumped or slid down ropes from the afterdecks."[3]

And where was the crew? Some, such as the stewards, took care of passengers with the same attention to their comfort as they had provided on the cruise. But others looked out only for themselves. Waiters, the crew from the engine room, and officers abandoned ship without concern for passengers, although 14 of the 230 officers and crew stayed to the last possible moment containing the fire and manning the boats. Chief Engineer Abbott, shirking his responsibility in the engine room, ran from lifeboat to lifeboat to see which would be lowered into the water first. He made it into the first boat to be lowered, and then refused to keep the boat near the stern where passengers had gathered hoping to be rescued. Rather, he ordered the lifeboat to head for shore with only himself, 28 other crew members, and three passengers aboard, ignoring the cries for help from survivors in the water around him.

The *Morro Castle* could be called a victim of her time — a time when there were fewer federal regulations for safety and when the regulations that existed could easily be dodged. We would not be recalling this tale of incompetance, confusion, chaos, and unnecessary loss of life if company and public officials had performed their jobs honestly and fully. If they had, then the crew aboard the ship might have been competent enough to handle the emergency rather than act as cowards. Many of the so-called "certified" seamen were not only unqualified to serve on a ship, but they paid for their jobs in order to smuggle drugs between Havana and New York. The Ward Line shipping master who hired the crews for the *Morro Castle* could neither read nor write English. In addition, 20 percent of the crew was new every week, so it is easy to understand why members of the crew acted untrained and inexperienced that fateful night—many of them were!

With the perspective of time, it appears that if the experienced captain of the ship had not died of a heart attack earlier that evening, the outcome of the fire would have been vastly different. Apparently, "The death of a liner's captain at sea was in those days...like the death of a dictator. The shipping unions were weak, jobs were scanty, and the captain was an absolute ruler of his ship."[4] Captain Robert Wilmott ran a very tight ship—which proved to be its undoing in the fire emergency—for no one but he had ever given orders. The ship's master, Chief William Warms, had only done what he was told. Finding himself in command of the ship, then having to face a major emergency, is it any wonder that Chief Warms became mentally paralyzed to act?

The fire began in a locker in the ship's writing room on the promenade deck where about 100 blankets were stored that had just been cleaned with a flammable substance. The room was decorated with highly polished paneling that also lined the walls of corridors, stairways, and other passenger accommodations. This combustible material provided the fuel for the raging fire.

The fire was "officially" discovered about 2:45 a.m. by several passengers and crew members who detected smoke coming from the writing room.[5] At about the same time, the night watchman detected smoke coming through the ventilating system. By 2:56 a.m., the monitoring panel of the electric fire sensor system indicated that every stateroom was either in flames or hot enough to sound the alarm. Most telephones were inoperable by this time. At 2:57 a. m., the Master ordered the crew to stand by the lifeboats. At 3:00 a.m., he ordered the vessel turned toward shore. At the same time, the ship's Lyle gun and powder exploded, blowing out many windows. At 3:10 a.m., the electricity failed, throwing the gyrocompass, electric steering apparatus, and standby hydraulic system out of action. (An emergency steering system at the stern was not used.) At 3:18 a.m., Chief Warms gave the order to transmit an S.O.S. At 3:21 a.m., all engines were ordered to stop. Then the order to drop anchor was given, followed by the order to abandon ship.

The Steamboat Inspectors' report included observations that the officers made no effort to fight and control the fire, to close fire screen doors, or to shut off the ventilating system. The crew did not take its regular fire stations, nor was any attempt made to organize them. Chief Warms never left the bridge to investigate the fire and did not change the ship's course, heading full speed into a 20-mile wind, driving the fire aft. The Inspectors' report stated: "Had he (Warms) taken prompter action in this respect it is possible that he may have been able to have controlled the fire or at least to have controlled it to such an extent as to have been able to have saved a larger number of passengers." But, with all exhausts and venting systems wide open and in full force, the fire was soon beyond control. In little over half an hour after the fire had been detected, the order was given to abandon ship.

The Board of Investigation's inspection revealed that the fire doors had not been used to check the fire, that a number of hydrants were not used, and that at least five of them had steel caps screwed over them — including the one which covered the writing room where the fire began. According to the Board's report, it was "apparent that no successful effort was made on the part of any of the officers or crew to lead (passengers) up to the boat deck by way of the crew's service stairways, nor to lead them up outside. No successful effort was made by any of the lifeboats that left the burning vessel to go under her stern and render assistance to the large number of passengers gathered there. Thus (they) were cut off from the lifeboats by the flames, and their only means of escape was to lower themselves into the water by means of ropes or by jumping overboard from the stern of the vessel..."

Six of the 12 lifeboats with a total capacity of 408 persons were actually lowered. They carried, however, only 85 people and most of them were crew. The grand jury of the Southern District of New York concluded that "In the panic and confusion, passengers were left to help and save themselves." It indicted Chief Warms for failing to control the ship in order to contain the fire and for not issuing distress signals to other ships, or lowering lifeboats on time. It indicted Chief Engineer Abbott for failing to assign fire stations to the engine room department. It concluded that the crew were undisciplined and untrained in how to handle a fire emergency and that they did not know their stations or duties.

It seems that Captain Wilmott had been more concerned with not disturbing his passengers' enjoyment than he had been with assuring their safety, and did not require them to attend fire drills. As already indicated, many of them did not know how to properly put on their life preservers. The United States Steamboat Inspection Service required fire drills on each voyage. The crew should have been required to report to their fire stations, drop the lifeboats to the water, and then row them for a half hour. But, to quote a crew member, "The drills were a joke." Those who did report (and not all crew members needed to report) merely stood by their posts for awhile. Fire and boat drills were not even mentioned in the ship's logbook!

It has been 50 years since the *Morro Castle* disaster and nothing quite like it has happened since. There are a lot of "ifs" about this sequence of events that could have changed the ending of the story. The outcome may have been very different *IF*:

- the alarm had been sounded without delay;
- the crew had been trained and drilled in emergency procedures;
- fire drills had been held for both passengers and crew;

- automatic trip wires on the automatic fire doors had not been removed prior to the fire;
- the cargo hold smoke detector system had not been vented outside the wheelhouse because of the offensive odor of some of the cargo;
- fire hydrants had not been capped;
- there had been firestops in horizontal and vertical voids, and ducts in dampers;
- interior structural members, bulkheads, overheads, and decks had been fire resistive, noncombustible, or fire retardant;
- a sprinker system had been installed throughout.

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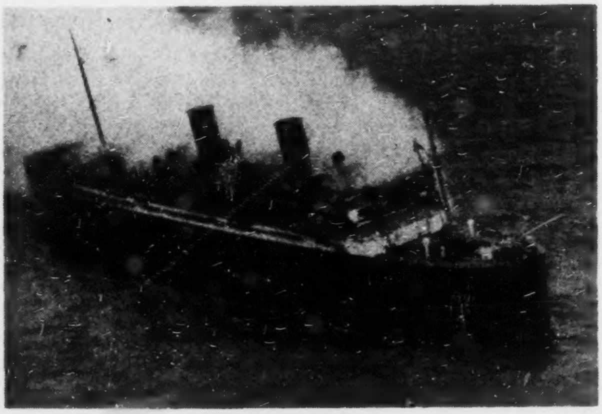
[1] David Canter, ed., *Fires and Human Behavior*, New York: John Wiley & Sons, 1980, p. 3.

[2] Hal Burton, *The Morro Castle*, New York: The Viking Press, 1973, p. 59.

[3] *Ibid.*, p. 79.

[4] *Ibid.*, p. 5.

[5] William McFee, a writer of sea stories, reports that two passengers smelled smoke soon after midnight. They were John Kempf, a city fire fighter for Maspeth, Long Island, New York, and Harriet B. Brown, a stewardess. McFee hypothesizes that the fire developed when the funnel base became overheated through neglect of the burners in the furnaces. Since the funnel casing passed through the ship behind the writing room walls, the heat would have been most intense where the funnel passed through the writing room behind the locker. Assuming this, the steel structure around the funnel would have been red-hot for hours, charring woodwork, eroding insulation, and giving off the smell of smoke. Thus the ship's infrastructure could have been smoldering for hours before breaking out in the flames that consumed the ship so rapidly. See "The Peculiar Fate of *The Morro Castle*," by William McFee in *The Aspirin Age, 1919-1941*, Isabel Leighton, ed., New York: Simon and Schuster, 1949, pp. 313-338.



S.S. Morro Castle in flames off the New Jersey Coast, 1934.

Where to Find Information about Marine Fires

Information about marine fires can be obtained from the following sources.

Commercial Vessels

U. S. Coast Guard
The U. S. Coast Guard investigates all marine casualties within U. S. waters and all marine casualties involving U. S. flag vessels worldwide and issues a report (formal or informal according to the degree of casualty) that outlines the cause of the casualty and contains recommendations for preventing recurrences. The U.S.C.G. also issues an annual summary of vessel casualties in its *Marine Safety Statistical Review*.

Copies of marine casualty reports, the Statistical Review, and the latest computer data may be obtained by writing:

Commandant USCG (G-MA)
U. S. Coast Guard Headquarters
Washington, DC 20590

National Transportation Safety Board

NTSB investigates marine casualties depending on the severity of the casualty. These reports also identify the probable cause of the accident and recommend solutions. Reports can be obtained from the National Transportation Safety Board, Washington, DC 20594. Specify date and place of marine accident and that you want the "Marine Accident Report" for it.

International Chamber of Shipping (ICS)

ICS issues reports on all accidents (worldwide) brought to their attention. They will provide these reports upon request. Write: International Chamber of Shipping, 30-32 St. Mary Avenue, London EC3A8ET, England.

Lloyd's of London

Lloyd's of London issues daily bulletins of vessel casualties around the world. A brief description of the casualty is included. The Casualty Services Branch of Lloyd's of London Press maintains extensive records of casualty information and statistics dating back many years. This information is recorded in a variety of ways and can be made available upon request. For example, the following types of information can be supplied from their Casualty Files:

- Reported casualty histories of named vessels.
- Serious casualties to tanker and OBOs of 50,000 dwt and above since 1968.
- Casualties to vessels in specific geographic areas.
- Casualties categorized by type, e.g., groundings, collisions, fires or explosions, machinery damage.
- Casualties to drilling rigs.
- Marine losses listed by flag.

For further details of services and charges contact:

Norman Hooke
Casualty Records, Intelligence Department
Lloyd's of London Press Ltd.
Sheepen Place
Colchester, Essex CO3 3LP, England
Telephone: (0206) 69222, Extension 242

Recreational Craft

The U. S. Coast Guard issues an annual report on recreational boating accidents. The latest report is for calender year 1980 and covers all boating accidents which occurred on:

1. The waters of the United States under joint or federal jurisdiction.
2. Those waters under exclusive state jurisdiction within a state having an approved numbering system.
3. Those waters under exclusive state jurisdiction within a state not having an approved system for which reports are received.
4. International waters, such as the high seas, for which reports are received.

The U.S. Coast Guard investigates all fatal boating accidents which occur on waters under joint or federal jurisdiction. The findings for each investigation are transmitted to

U. S. Coast Guard Headquarters in Washington, DC in a written report which is used in developing the statistics for the annual report.

The statistics in the report are broken down by state and causes of accidents. One of the causes of an accident identified in the report is fire and explosion, which is further broken down into equipment failure (i.e., fuel system failure, electrical system failure. etc.) and miscellaneous (i.e., ignition of spilled fuel or vapors, misuse of source of heat,.etc.). The complete report can be obtained by writing to Commandant (G-CMA), U. S. Coast Guard, Washington, DC 20593.

Lessons of Famous Shipboard Fires and Explosions

Morro Castle

Description: Cruise ship 508 feet in length, 70 feet wide
11,520 gross tons

Date: September 8, 1934

No. People: 318 passengers
231 crew
135 dead

Area of Origin: Locker in writing room on promenade deck containing approximately 100 blankets that had been cleaned with a flammable substance.

Fire Protection: 42 firemain outlets
portable fire extinguishers
fire hose
smoke detection system in cargo holds
fixed fire extinguishing systems in cargo holds and engine room
automatic fire doors

Most of these safety features were made ineffective by alterations and/or lack of proper training.

Lessons Learned:

1. Crew must be thoroughly trained in emergency procedures.
2. Drills must be held for benefit of crew and passengers.
3. Sprinkler system, or a continuously monitored smoke and fire detection system should be installed throughout passenger vessels. Interior structural members, bulkheads, overheads, and decks should be fire resistive, noncombustible, or fire retardant.
4. Firestops should be installed in horizontal and vertical voids, wherever smoke, heat, and fire can move from one space to another. Ducts should be equipped with dampers.
5. Alarm must be sounded without delay.
6. Fire detection and fire fighting systems should not be altered, removed, or changed to reduce their effectiveness.

WE WANT TO KNOW . . .
if a name, an address, or a phone number has changed; if there's an upcoming event, a new program or course, a new publication being offered. If you have more current information than is contained in this *Almanac*, know something that should be included in this book, or just have something interesting about the fire protection scene that you want to contribute, please let us know. Write: Editor, *Fire Almanac*, NFPA, Batterymarch Park, Quincy, MA 02269. All suggestions will receive our careful attention.

Normandie/USS Lafayette

Description: Cruise ship 1,000 feet in length
80,000 gross tons

Date: February 9, 1942

No. People: 1,300 crew

Area of Origin: Grand Salon where sparks from a cutting torch ignited canvas-covered life preservers made of highly flammable kapok.

Fire Protection: 224 fire alarm stations (not working at time of fire)
fire guards with little or no training
fire extinguishers (either empty or with instructions written in French)
hose connections, in process of conversion from French to U.S. hose thread

Lessons Learned:

1. Lines of responsibility for fire protection of commandered vessel need to be clearly defined.
2. Care must be used in directing hose streams onto the upper parts of a ship, as water affects stability of vessel. In this fire, many tons of water were poured on the fire 10 decks above the keel. It could not run off and caused the ship to capsize.
3. Keep repairs requiring hot work to a minimum. Do hot work only under personal supervision of a ship's officer.
4. Greater surveillance and increased fire protection required when ships undergo repairs and alterations.
5. Past fire experiences should be used to preplan fire protection.

Yarmouth Castle

Description: Cruise ship 379 feet in length
5,000 gross tons

Date: November 13, 1965

No. People: 165 crew
376 passengers
87 dead (85 passengers, 2 crewmen)

Area of Origin: Storage room on main deck that contained mattresses, chairs, paneling, and other combustible materials (unsprinklered).

Fire Protection: Portable fire extinguishers
Fire pumps and hoselines

Lessons Learned:

1. Early detection of fire and prompt sounding of alarm essential.
2. Crew must understand why fire prevention necessary.
3. Crew must be trained and drilled in how to function during an emergency and in the use of portable fire extinguishers, hoselines, and breathing apparatus.
4. A smoke detecting and/or sprinkler system required in passenger and crew accommodations.
5. Where feasible, fire resistive, noncombustible, and fire retardant materials should replace combustible interior construction.
6. Master should never leave his ship (as this one did).

MV Alva Cape and SS Texaco Massachusetts

Description: Four separate ship fires (two tankers and two tugboats) that resulted after the tankers collided. The *Massachusetts* had just discharged gasoline and was heading out of port with tug *Latin America* alongside.

The *Alva Cape* was heading into port with 5,579,868 gallons of naphtha in 21 tanks. The tugboat *Vermont* was trying to overtake her.

Date: June 16, 1966

No. People: 39 crew and 2 pilots aboard *Massachusetts*
44 crew aboard *Alva Cape*
33 dead; 64 injured (includes fire fighters)

Area of Origin: Explosions and fires after impact of prow of the *Massachusetts* with the No. 1 starboard wing tank of the *Alva Cape*. Source of ignition for explosion near *Massachusetts* was most likely caused by the *Latin America* and for the *Alva Cape*, the *Vermont*.

Lessons Learned:

1. Vessels should have communicated via radiotelephone.
2. Precautions against reignition should be taken in fires involving flowing volatile and combustible liquids. Flotation rings, hose streams, emulsifiers, foam blankets can be used for this purpose.
3. Caution, discipline, and close supervision of individuals must be maintained in such situations.
4. Traffic control critical in vicinity of such a fire.
5. Commit only minimum manpower possible in hazardous and potentially explosive situation. To minimize risk to fire fighters, separate fire problem into parts and attack parts on a priority basis.
6. Rotate fire fighters to minimize exposure time.
7. Conduct salvage operations involving vessels carrying flammable products using methods that safeguard against the creation of explosive atmospheres.

The MV Alva Cape burns on her way into port with 5,579,868 gallons of naphtha on board. This was one of four fires that resulted when two tankers collided, resulting in 33 deaths. (N.Y. Daily News Photo)

MV San Francisco Marie

Description: Cargo ship 511 feet in length
10,087 gross tons
Date: March 30, 1968
No. People: 34 crew
Area of Origin: Lower hold
Fire Protection: Smoke detecting and CO_2 extinguishing system.

Lessons Learned:

Confirmation of the following, since the fire was successfully contained in the lower hold and extinguished by the CO_2 system, without the use of water.

1. Crewmen need to be trained in using CO_2 to extinguish fire. Through training, they gain confidence in the fire protection equipment itself in addition to learning how to use it.
2. Early detection of smoke and/or fire is essential. Therefore, the automatic detection system should always be monitored. In this case, the monitoring cabinet was on the bridge and since the ship was in port, the bridge was unoccupied.
3. To prevent errors under fire conditions, frequent drills should be held with the CO_2 extinguishing system.
4. CO_2 is the safest and most efficient extinguishing agent for hold fires. Water is less effective and may create a stability problem and could damage cargo. CO_2 does not damage cargo.
5. Patience is essential when CO_2 flooding is used to extinguish a hold fire. This fire, which was detected about 5:00 p.m. on Saturday, was not confirmed extinguished until the following Monday morning.

SS Monticello Victory

Description: Tank vessel 736 feet in length
49,229 tons deadweight
Date: May 31, 1981
Area of Origin: Hot work in engine room on bilge discharge line connected by a portable line to a non-gas free cargo tank. An unobstructed path for flame propagation from welding operations to non-gas free tank existed, causing explosion.

Lessons Learned:

1. Failure to provide flame screen protection on Butterworth opening to cargo tank.
2. Open unobstructed line allowed flammable concentrations path from source of vapors to hot work area.
3. Survey by a qualified person should be conducted prior to any hot work on a pipe line.

NOTE: The information for the first five summaries is contained in *Marine Fire Prevention Firefighting and Fire Safety*, available from the Maritime Training Advisory Board of the Maritime Administration. Complete accounts of these incidents and others are included in the report. The information for the last summary is contained in National Transportation Safety Report on *SS Monticello Victory*, HTSB-Mar.-81-14, National Technical Information Service, Springfield, VA 22161.

Forest Fires

FOREST ACRES BURNED BY CAUSE — 1978

Causes*	Lightning %	Camp Fires %	Smoking %	Debris Burning %	Incendiary %	Equipment Use %	Railroad %	Children %	Misc. %
United States	21	2	6	16	34	8	3	2	8
Rocky Mountain Group	29	3	4	15	5	19	5	2	18
Pacific Group	58	3	2	6	12	7	1	2	9
North Central Group	14	3	4	20	38	9	6	1	5
Eastern Group	2	3	7	11	49	3	6	8	11
Southern Group	4	2	8	20	55	3	2	2	4

Rocky Mountain Group: Arizona, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, South Dakota, Utah, Wyoming; *Pacific Group:* Alaska, California, Guam, Hawaii, Oregon, Washington; *North Central Group:* Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, Wisconsin; *Eastern Group:* Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, West Virginia; *Southern Group:* Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia.

**Fire Causes Defined*

Lightning:	Self-explanatory.
Campfire:	A wildfire resulting from a fire started for cooking, heating, or providing light or warmth.
Smoking:	Wildfires caused by smokers from matches, lighters, tobacco or other smoking materials.
Debris Burning:	A wildfire spreading from clearing land, burning trash, range, stubble, meadow, right-of-ways, logging slash, or other prescribed burning.
Incendiary:	Wildfires willfully set by anyone to burn, or to spread to, vegetation or property not owned or controlled by him, and without consent of the owner or his agent.
Equipment Use:	Wildfires caused by any and all mechanical equipment other than railroad operations.
Railroad:	Wildfires caused by all railroad operations including burning rights-of-ways and ties.
Children:	Wildfires started by children less than 12 years old.
Miscellaneous:	Wildfires that cannot be properly classified under other general causes.

Source: *Wildfire Statistics* — U.S. Department of Agriculture

FOREST ACRES BURNED BY CAUSE — 1981

State	Lightning	Camp Fires	Smoking	Debris Burning	Incendiary	Equipment Use	Railroad	Children	Misc.	Total
AK	179	7	2	8	4	1	0	1	5	207
AZ	66	4	4	11	7	5	1	2	18	118
CA	13	7	1	7	12	9	3	0	16	68
CO	191	8	0	5	0	1	12	1	68	286
ID	72	5	3	38	20	17	8	8	62	233
MT	44	2	1	5	1	1	1	0	4	59
NV	94	11	10	58	30	24	11	0	10	248
NM	23	0	0	1	0	1	0	0	7	32
OR	106	7	6	10	2	5	8	5	15	164
UT	181	3	10	13	5	15	1	4	14	246
WY	31	7	7	2	5	8	0	8	11	79
TOTAL	1,000	61	44	158	86	87	45	29	230	1,740

Source: U.S. Department of the Interior, Bureau of Land Management

FIRE INCIDENT DATA — 1981

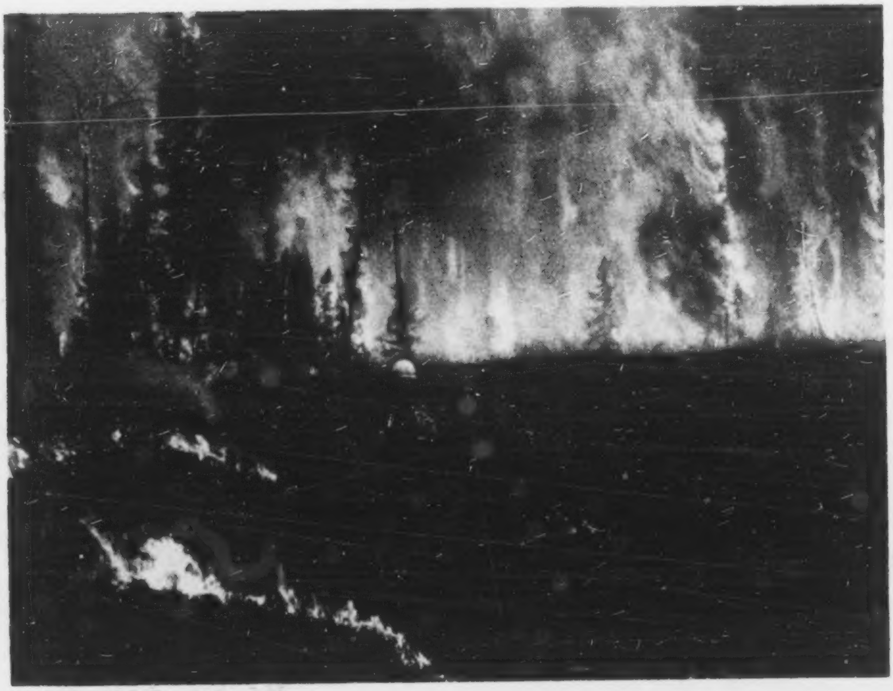
State	# Fires	Acres Burned	$ Damage (Thousands)
AK	207	292,783	5,673
AZ	118	3,948	170
CA	68	27,832	1,564
CO	286	3,385	98
ID	233	392,905	10,555
MT	59	10,464	110
NV	248	12,559	716
NM	32	3,532	12
OR	164	60,917	2,646
UT	246	53,369	1,140
WY	79	13,520	349
TOTAL	1,740	875,214	23,033

Source: U.S. Department of the Interior, Bureau of Land Management

Bureau of Land Management Fire Protection Program Statistics (1981)

Fire Stations:	131
Air Attack Bases:	17
Engines:	346
Bulldozers:	3
Aircraft:	
Air Tankers	18
Helicopters	53
Fire Personnel:	
Permanent	178
Personal & Temporary	2,000
Budget (FY'81):	
Operating and Management:	$33.5 million
Emergency Firefighting Fund:	24.6 million
Acres Protected:	
Bureau of Land Management Direct Protection	386,334,000 acres
By Other Agencies through Contract	15,658,000 acres
TOTAL	401,992,000 acres

Source: U.S. Department of the Interior, Bureau of Land Management



(Courtesy U.S. Forest Service)

Fire Service

Profile of the U.S. Fire Service

Comparison of Public Fire Protection

The NFPA has been collecting data on selected fire departments in the United States which it has compiled in a system known as the Fire Service Inventory. The data includes the department address; population served; area served in square miles; the number of pumpers, ladder trucks or aerial apparatus, and stations; the number of career, call, and volunteer firefighters; average hours worked per week for career fire fighters; size of budget; and whether the department provides emergency medical services and/or operates an ambulance service.

The NFPA has identified 28,776 fire departments in the United States which provide public fire protection at the local level. The following five tables show aggregation of data from the Fire Service Inventory for each of four geographic regions and for the United States as a whole. The four regions are based on the standard U.S. Bureau of the Census regions. The states in each region include:

Northeast: Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont.

Northcentral: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.

South: Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia.

West: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

In the tables that follow, the data is presented as summaries for each of four population strata, those departments that protect 250,000 persons or more: those departments that protect between 50,000 and 249,999 persons; those departments that protect between 10,000 and 49,999 persons, and those departments that protect less than 10,000 persons. The data is summarized for those departments that have reported, with no attempt to project or estimate the data for departments that have not reported.

In the tables, columns 2, 4, and 6 show the number of pumpers, ladder trucks for elevating platforms), and firestations per 1,000 persons protected. Columns 3, 5, and 7 show the number of square miles serviced by each pumper, ladder or aerial apparatus, and fire station. Since many departments do not have a ladder truck or aerial apparatus, only those departments actually reporting that they have a ladder truck or aerial apparatus are used in the calculations for columns 4 and 5.

Columns 8 and 9 show the percentage of the departments which supply emergency medical services and/or provide ambulance service.

Column 10 shows the number of career fire fighters per 1,000 persons protected. Only those departments with one or more career fire fighters were used in the calculations for this column.

Column 11 shows the number of paid on call or volunteer fire fighters per 1,000 persons protected. Only those departments with one or more paid, on call, or volunteer firefighters were used in the calculations for column 11.

The number in the second row below each figure is the number of fire departments that have reported the data necessary for the calculation and were used in the calculation.

COMPARISON OF PUBLIC FIRE PROTECTION BY REGION AND POPULATION PROTECTED

Population Range	No. of fire departments	Pumpers per 1,000 persons protected	Sq. mi. serviced by each pumper	Ladder trucks per 1,000 persons protected	Sq. mi. serviced by each ladder truck	Fire stations per 1,000 persons protected	Sq. mi. serviced by each fire station	% providing EMS	% providing ambulance service	Career fire fighters per 1,000 persons protected	Call or volunteer fire fighters per 1,000 persons protected
Northeast Region											
250,000 or more	6	0.04 6	1.5 6	0.02 6	2.5 6	0.04 6	1.4 6	50.0 6	16.7 6	1.83 6	
50,000–249,999	99	0.08 31	2.3 29	0.04 31	5.0 29	0.07 28	2.6 28	61.5 26	38.7 62	2.32 82	2.06 26
10,000–49,999	865	0.19 252	28.6 231	0.06 180	19.8 159	0.11 232	51.7 227	55.9 227	42.5 400	1.65 281	3.76 503
Less than 10,000	5897	0.70 833	23.6 822	0.19 145	19.8 143	0.34 830	50.4 818	42.6 847	28.9 1140	1.30 124	11.20 1525
Northcentral Region											
250,000 or more	14	0.05 14	3.6 14	0.03 14	6.9 14	0.05 14	3.6 14	92.9 14	42.9 14	1.56 14	
50,000–249,999	122	0.07 36	5.2 36	0.03 35	14.4 35	0.07 36	5.7 36	97.1 35	65.3 75	1.35 114	0.82 24
10,000–49,999	1010	0.17 247	12.0 245	0.05 199	30.3 198	0.09 249	21.9 247	77.8 248	50.9 491	1.01 616	1.79 629
Less than 10,000	8327	0.70 659	36.9 654	0.20 88	48.4 88	0.36 656	74.1 651	49.7 672	25.8 1083	1.70 310	8.55 2343

South Region

250,000 or more	33	0.06 33	11.2 33	0.02 33	31.4 33	0.06 33	11.8 33	69.7 33	42.4 33	1.47 33	1.50 10
50,000–249,999	155	0.09 84	17.2 82	0.02 72	44.3 71	0.07 82	21.5 80	62.5 80	20.6 102	1.46 [illegible]	1.00 45
10,000–49,999	953	0.17 332	60.5 327	0.04 121	50.9 121	0.10 332	99.0 327	59.6 322	21.8 468	1.25 505	1.71 504
Less than 10,000	7525	0.53 605	59.7 610	0.28 37	54.3 37	0.35 645	101.9 654	34.4 665	10.9 910	1.29 261	6.57 1338

West Region

250,000 or more	20	0.06 20	18.5 20	0.02 20	69.2 20	0.05 20	19.7 20	95.0 20	15.0 20	1.19 20	0.56 6
50,000–249,999	138	0.08 35	9.3 35	0.02 32	30.8 32	0.06 34	11.5 34	100.0 25	21.7 83	1.14 126	0.49 38
10,000–49,999	450	0.23 115	20.9 115	0.05 63	42.2 63	0.11 117	43.0 117	81.0 63	26.6 233	1.00 338	1.62 290
Less than 10,000	3162	0.86 407	44.6 406	0.37 26	56.6 27	0.48 415	78.9 413	55.6 257	22.7 617	1.31 290	7.97 850

All Regions

250,000 or more	73	0.05 73	10.6 73	0.02 73	27.0 73	0.05 73	11.0 73	79.5 73	32.9 73	1.49 73	1.26 16
50,000–249,999	514	0.08 186	11.2 182	0.03 170	26.5 167	0.07 180	13.5 178	75.3 166	34.8 322	1.49 455	0.98 133
10,000–49,999	3278	0.18 946	33.9 918	0.05 563	32.9 541	0.10 930	60.4 918	65.5 860	36.7 1592	1.18 1740	2.25 1926
Less than 10,000	24911	0.68 2504	37.9 2492	0.22 296	37.7 295	0.37 2546	74.2 2536	2.7 2441	22.6 3750	1.42 985	8.71 6056

Profile of Major Metropolitan Fire Departments

The following chart shows some basic data about the metropolitan fire departments in the United States. A metropolitan fire department is defined for this purpose as one which protects 200,000 persons or more or which has at least 400 career fire fighters. The chart shows the area served in square miles, the population protected, the number of career firefighters, the average hours per week worked, the number of call or volunteer firefighters, the number of pumpers, ladder trucks or aerial apparatus, and fire stations; the approximate annual budget; and whether the department provides emergency medical service and/or ambulance service. The table on "Profile of EMS Delivery in Metropolitan Areas" provides additional details of the emergency medical service delivery for the same communities.

While budget information is presented here, the reader is cautioned against using this information for comparison purposes. Differing budgeting and accounting procedures mean that such expenses as capital improvements, pensions, disability costs, and possibly other costs may or may not be included and this can have an impact on budgets. Likewise, the hours worked per week and whether the fire department provides ambulance service will have serious impact on the size of the budget.

FIRE PROTECTION PROFILE OF MAJOR METROPOLITAN CITIES

Fire Department	State	Area Protected (sq. miles)	Population Protected	Career Firefighters	Work Week	Call or Volunteer Fire-fighters	Pumpers	Ladder Trucks	Stations	Budget in Dollars	Provide Emergency Medical Service	Operate Ambulance Service
Akron	OH	61	237,000	386	52	0	14	5	14	14,000,000	Y	Y
Albuquerque	NM	100	335,000	460	56	0	17	5	17	13,800,000	Y	N
Anaheim	CA	43	210,000	217	56	0	11	3	9	11,200,000	Y	N
Anchorage	AK	500	230,000	276	56	60	21	3	15	22,100,000	Y	Y
Anne Arundel County	MD	440	370,000	391	54	1500	29	5	29	16,100,000	Y	Y
Atlanta	GA	136	425,000	920	56	0	33	18	33	22,000,000	Y	N
Austin	TX	128	400,000	521	56	0	25	9	26	18,000,000	Y	N

Baltimore County	MD	621	672,000	900	53	3000	89	9	52	25,000,000	Y	Y
Baltimore	MD	91	786,775	1850	47	0	52	29	57	63,200,000	Y	Y
Baton Rouge	LA	73	240,000	510	56	0	18	7	0	11,000,000	N	N
Birmingham	AL	100	275,000	600	52	0	29	5	29	18,200,000	Y	N
Boston	MA	46	640,000	1580	42	0	33	21	34	47,600,000	Y	N
Buffalo	NY	42	370,000	975	40	0	23	13	31	19,694,355	Y	N
Charlotte	NC	138	322,734	570	52	0	25	8	24	13,700,000	Y	N
Chattanooga	TN	127	165,565	441	48	0	22	8	22	9,000,000	Y	Y
Chicago	IL	228	3,005,000	5021	42	0	104	60	102	140,000,000	Y	Y
Cincinnati	OH	76	383,058	808	48	0	28	14	27	23,614,700	Y	N
Cleveland	OH	77	574,269	995	48	0	33	18	31	38,000,000	Y	N
Cobb County	GA	326	325,000	282	56	0	19	4	19	7,900,000	N	N
Colorado Springs	CO	134	230,000	277	56	0	13	4	12	8,500,000	Y	N
Columbus	OH	183	564,871	811	56	0	28	10	27	29,500,000	Y	Y
Contra Costa Cty Cons	CA	185	283,000	268	56	60	21	4	18	10,500,000	Y	N
Corpus Christi	TX	116	235,000	295	56	0	15	4	12	6,500,000	Y	Y
Dallas	TX	378	904,000	1499	54	1499	48	22	48	54,250,000	Y	Y
DeKalb County	GA	258	480,000	502	56	0	23	4	20	11,690,440	Y	Y
Denver	CO	115	491,000	896	48	0	27	16	26	36,000,000	Y	N
Detroit	MI	139	1,300,000	1317	50	0	45	28	52	89,134,837	Y	Y
District of Columbia	DC	69	631,000	1187	48	0	32	17	33	44,594,100	Y	Y
El Paso	TX	240	425,124	505	56	0	30	7	25	14,131,625	N	N
Fairfax County Fire and Rescue	VA	399	628,000	907	56	443	29	12	29	27,000,000	Y	Y
Forth Worth	TX	256	400,000	656	56	0	29	11	30	20,000,000	Y	N
Fresno City	CA	65	235,000	289	56	0	13	5	13	14,200,000	Y	N
Hartford	CT	18	137,000	427	42	0	12	6	12	12,000,000	N	N

Fire Department	State	Area Protected (sq. miles)	Population Protected	Career Firefighters	Work Week	Call or Volunteer Fire-fighters	Pumpers	Ladder Trucks	Stations	Budget in Dollars	Provide Emergency Medical Service	Operate Ambulance Service
Honolulu	HI	620	822,000	975	56	0	38	12	40	27,600,000	Y	N
Houston	TX	556	2,200,000	2900	46	0	72	34	74	120,300,000	Y	Y
Indianapolis	IN	81	505,000	769	56	0	31	17	31	22,000,000	Y	N
Jacksonville	FL	844	600,000	750	56	304	43	8	43	24,000,000	Y	Y
Jersey City	NJ	19	243,000	712	42	0	18	11	17	20,000,000	N	N
Kansas City	MO	316	446,562	790	48	0	31	15	31	23,698,000	Y	N
Kern County	CA	8000	290,000	475	56	230	65	1	42	15,174,712	Y	N
Knoxville	TN	76	182,000	401	56	0	20	8	19	11,900,000	Y	N
Long Beach	CA	55	365,000	477	56	0	18	8	21	35,000,000	Y	Y
Los Angeles City	CA	464	2,900,838	2783	56	0	100	47	104	132,000,000	Y	Y
Los Angeles County	CA	2190	2,269,087	2385	56	0	138	18	128	132,000,000	Y	N
Louisville Division of Fire	KY	70	300,000	610	56	0	22	10	23	14,803,437	N	N
Memphis	TN	320	750,000	1210	56	0	49	23	49	41,000,000	Y	Y
Metro Dade County	FL	1924	980,000	1191	48	6	27	13	36	48,389,000	Y	N
Metro Nashville	TN	533	485,000	736	56	0	34	14	33	20,000,000	N	N
Miami	FL	34	400,000	651	50	0	19	9	12	41,000,000	Y	N
Milwaukee	WI	96	636,000	1107	52	0	36	19	36	48,000,000	Y	N
Minneapolis	MN	59	375,000	510	56	0	19	11	20	22,000,000	Y	N
Mobile	AL	142	205,200	388	56	0	18	4	18	9,588,000	Y	N
Montgomery County Fire and Rescue	MD	506	600,000	715		750	31	15	33	38,000,000	Y	Y
New Haven	CT	18	125,000	416	42	0	10	6	10	12,000,000	Y	N
New Orleans	LA	399	600,000	915	56	0	40	13	36	24,000,000	N	N

New York City	NY	303	7,100,000	12000	40	0	210	138	221	419,200,000	N	N
Newark	NJ	23	329,000	879	42	0	22	11	26	19,000,000	N	N
Norfolk	VA	63	280,000	444	56	0	15	8	14	12,297,787	N	N
Oakland	CA	56	329,000	468	52	0	23	7	23	32,263,489	Y	N
Oklahoma City	OK	335	390,000	763	56	0	27	11	30	18,000,000	N	N
Omaha	NE	92	333,083	555	56	0	22	9	18	13,435,426	Y	Y
Orange County	CA	70	600,000	450	67	535	61	7	44	36,000,000	Y	N
Orange County	FL	870	250,000	450	56	50	40	4	25	15,000,000	Y	N
Philadelphia	PA	129	1,688,210	2858	42	0	66	33	68	71,348,188	Y	Y
Phoenix	AZ	345	825,000	839	56	0	36	8	35	35,000,000	Y	N
Pittsburgh	PA	55	450,000	1111	42	0	39	20	39	23,328,680	N	N
Portland Fire Bureau	OR	110	380,000	665	56	0	28	10	27	27,000,000	Y	N
Prince George's County	MD	494	686,000	513	42	1100	45	21	46	17,300,000	Y	Y
Providence	RI	19	156,804	479	42	0	15	8	14	8,100,000	Y	N
Richmond	VA	63	220,500	573	56	0	21	9	20	16,000,000	N	N
Rochester City	NY	36	241,000	605	42	0	17	9	16	26,400,000	Y	N
Sacramento	CA	95	281,104	432	56	100	19	9	19	21,000,000	Y	N
Saint Louis	MO	62	500,000	811	52	0	30	16	30	17,872,520	N	N
Saint Paul Fire and Safety Services	MN	55	270,000	408	56	0	18	7	16	14,300,000	Y	Y
Saint Petersburg	FL	58	250,000	295	56	0	11	4	10	10,277,000	Y	N
Salt Lake City	UT	65	200,000	361	56	0	14	5	14	7,649,682	Y	N
Salt Lake County	UT	526	250,000	240	56	40	15	2	14	9,342,318	Y	Y
San Antonio	TX	267	783,296	1102	56	0	40	15	38	30,000,000	Y	Y
San Diego	CA	325	893,000	776	56	0	40	11	39	31,000,000	Y	N
San Francisco	CA	49	675,000	1569	49	0	41	18	41	92,378,000	N	N
San Jose	CA	222	680,000	651	56	0	28	10	28	23,150,000	Y	N

Fire Department	State	Area Protected (sq. miles)	Population Protected	Career Firefighters	Work Week	Call or Volunteer Fire-fighters	Pumpers	Ladder Trucks	Stations	Budget in Dollars	Provide Emergency Medical Service	Operate Ambulance Service
Santa Ana	CA	27	202,000	211	56	0	10	3	10	11,200,000	Y	N
Seattle	WA	98	475,000	950	45	0	32	11	33	36,000,000	Y	N
Shreveport	LA	99	220,000	392	56	0	18	7	18	11,000,000	Y	N
Springfield	MA	34	157,000	472	42	0	13	7	11	9,000,000	N	N
Syracuse	NY	26	172,000	489	48	0	11	6	12	11,500,000	Y	N
Tallahassee	FL	700	250,000	139	54	0	7	2	5	3,500,000	N	N
Tampa	FL	84	278,000	531	52	0	20	5	18	17,100,000	Y	Y
Toledo	OH	86	354,635	525	48	0	20	6	20	13,952,630	Y	Y
Tucson	AZ	102	342,000	402	56	0	16	6	15	14,600,000	Y	N
Tulsa	OK	181	366,000	689	54	0	31	13	31	16,000,000	N	N
Ventura County	CA	865	320,000	321	56	175	27	1	27	21,000,000	Y	N
Virginia Beach	VA	320	262,000	261	56	250	15	4	15	7,500,000	N	N
Wichita	KS	110	280,000	397	56	0	19	12	17	10,000,000	Y	N
Worcester	MA	38	156,804	457	42	0	16	7	13	9,000,000	N	N
Yonkers	NY	21	210,000	418	37	0	10	6	12	8,400,000	Y	N

Profile of Emergency Medical Service Delivery in Metropolitan Areas

The following chart shows how emergency medical services are provided in the areas protected by 96 metropolitan fire departments. A metropolitan fire department is defined for this purpose as one which protects 200,000 or more persons or has at least 400 career fire fighters. The chart shows who provides first responder or basic life support service (column 1); who transports the patient in basic life support situations (column 2); who provides advanced life support or paramedic service (column 3); and who transports the patient in advanced life support situations (column 4). In those areas where a private company provides emergency medical service or transportation, column 5 shows whether a contract exists between the community and the private company, column 6 shows who bills the patient for transportation, and column 7 shows the amount of the basic service.

The codes used in this chart are:

F: Fire Department
P: Police Department
S: Separate Public Agency
C: Private Ambulance Company

EMERGENCY MEDICAL SERVICE DELIVERY FOR MAJOR METROPOLITAN COMMUNITIES

Dept.	State	First Responder	BLS Trans	ALS (Paramed)	ALS Transport	Contract Bet. Community and Private Ambulance Company	Who Bills	Fee in Dollars
Akron	OH	C	C	F	F	—	—	Free
Albuquerque	NM	F	C	F	C	Y	C	50
Anaheim	CA	F	C	F	C	Y	C	
Anchorage	AK	F	F	F	F	—	—	
Anne Arundel County	MD	F	F	F	F	—	—	Free
Atlanta	GA	F	C	F	C	Y	county	
Austin	TX	S	S	S	S	Y	city	
Kern County	CA	F, C	C	C	C	N	C	
Baltimore City	MD	F	F	F	F	N	—	Free
Baltimore County	MD	F	F	F	F	N	—	Free
Baton Rouge	LA	C	C	C	C	N	—	
Birmingham	AL	F	C	F	C	Y	C	80
Boston	MA	S	S	S	S	S	city	
Buffalo	NY	F	C	C	C	Y	C	65
Charlotte	NC	F, S	S	S	S	N	county	75
Chattanooga	TN	F	F	F	F	N	—	Free
Chicago	IL	F	F	F	F	N	—	Free
Cincinnati	OH	F	F	F	F	N	—	Free
Cleveland	OH	F	C	F	C	Y	C	
Cobb County	GA	C	C	C	C	Y	C	25 +
Colorado Springs	CO	F	C	F	C	N	C	

Dept.	State	First Responder	BLS Trans	ALS (Paramed)	ALS Transport	Contract Bet. Community and Private Ambulance Company	Who Bills	Fee How Much
Columbus	OH	F	F	F	F	N	—	Free
Contra Costa Cty	CA	F	C	F	C	Y	C	
Corpus Christi	TX	F	F	F	F	N	city	60
Dallas	TX	F	F	F	F	N	city	75
DeKalb County	GA	F	F	F	F	N	S	35
Denver	CO	F, S	S	S	S	N	S	
Detroit	MI	F	F	F	F	N	F	90
El Paso	TX	F	S	S	S			
Fairfax County	VA	F	F	F	F	—	—	Free
Fort Worth	TX	F	C	C	C	Y	C	
Fresno City	CA	F	C	F	C	Y	C	
Hartford	CT	F, P, C	C		C	Y	city	
Honolulu	HI	F, S	S	S	S	N	city	
Houston	TX	F	F	F	F	N	city	45
Indianapolis	IN	F	F, S	F	F, S	—	city	
Jacksonville	FL	F	F	F	F	N	S	45-50
Jersey City	NJ	P	S	S	S	S	city	
Kansas City	MO	F	C	F	C	Y	C	150 +
Knoxville	TN	F	C	F	C	Y	city	
Long Beach	CA	F	F	F	F	N	city	
Los Angeles City	CA	F	F	F	F	N		70
Los Angeles County	CA	F	C	F	C	Y	C	
Louisville	KY	S	S	S	S	N	S	
Memphis	TN	F	F	F	F	N	city	125
Metro Dade	FL	F	C	F	F	Y	C/S	75
Miami	FL	F	C	F	F	Y	C	75 +
Milwaukee	WI	F	C	F	F	Y	C	100
Minneapolis	MN	F	S	S	S	N	county	
Mobile	AL	F	C	F	C	Y	city	
Montgomery County	MD	F	F	F	F	N	—	Free
Metro Nashville	TN	F	F	F	F	N	city	50 +
Newark	NJ	S	S	S	S	N	S	
New Haven	CT	F, C	C		C	Y	S	
New Orleans	LA	P	P	P	P	N		

New York City	NY	S	S	S	S	N	Free	
Norfolk	VA	F	S	S	S	N		
Oakland	CA	F	C	C	C	Y		
Oklahoma City	OK	F	S	F	S	N	S	
Omaha	NE	F	F	F	F	N	—	Free
Orange County	CA	F	S	F	S	N	—	
Orange County	FL	F	C	F	C	Y	C	
Philadelphia	PA	F	F	F	F	N	—	
Phoenix	AZ	F	C	F	C	Y	C	
Pittsburg	PA	S	S	S	S	N	S	100
Portland	OR	F	C	F	C	N	C	145-175
Prince George's County	MD	F	F	F	F	N	—	Free
Providence	RI	F	C	F	C	N	—	
Richmond	VA	F, C	F, C	F	F	Y	C	
Rochester	NY	F, C	C	C	C	Y	C	100
Sacramento	CA	F	C		C	N	C	75-100
Saint Louis	MO	S	S	S	S	N	S	85 +
Saint Paul	MN	F	F	F	F	N	S	50
Saint Petersburg	FL	F	C	F	C	Y	C	100
Salt Lake City	UT	F, C	C	F	C	Y	C	100-120
Salt Lake County	UT	F	F	F	F	N		
San Antonio	TX	S	S	S	S	N		
San Diego	CA	F	C	C	C	Y	C	
San Francisco	CA	F	C	F	C	Y	S	
San Jose	CA	F	C	C	C	Y	C	
Santa Ana	CA	F	F	F	F	N	—	
Seattle	WA	F	F	F	F	N		
Shreveport	LA	F	C	none	C	Y	C	
Springfield	MA	C	C	C	C	Y	C	
Syracuse	NY	F	C	F, C	C	N	C	
Tallahassee	FL	C	C	C	C	N	—	
Tampa	FL	S	S	F	F	N	county	50-100
Toledo	OH	F	C	F	F, C	N	C	50-60
Tucson	AZ	F	F	F	F	N		
Tulsa	OK	S	S	S	S		S	
Ventura County	CA	F	C	C	C	Y	C	
Virginia Beach	VA	S	S	S	S	—	city	
Washington	DC	F	F	F	F	N	city	35-70
Wichita	KS	F	S	S	S	N	city	55 +
Worchester	MA	F, P	S	S	S	Y	city	
Yonkers	NY	P	C	none	C	Y	C	

The Cost of Maintaining a Fire Department/1983

Fire Station Construction Costs

The tables that follow can be used to calculate the approximate cost of building a fire station in various locations throughout the U.S.

The first table represents the low average, average, and high average gross building costs per square foot of fire station construction for the entire country. To use this table, choose those components of the building that you plan to include, then use the figures given to calculate the cost per square foot in each category — low average, average, and high average. The three different totals will yield a comparative range of gross building costs for consideration.

The next group of tables show fire station construction costs by locality. To use these tables, first calculate the gross building cost as directed above. Next, find your community on the table (not all communities are listed) and the corresponding number under the column heading "Average." (As you can see, the number in the average column is an average of the number under the labor column and the number under the material column. Hence, for Springfield, MA, adding 0.85 and 0.91 yields 1.76, which when divided by 2 yields the number under the average column, or 0.88.) Now, take the number from the average column (in the case of Springfield, MA, 0.88) and multiply it by the gross building cost per square foot that you calculated earlier. This will give you a low, average, and high gross building cost per square foot of construction for building a fire station in your community.

Example: (for Springfield, MA)

1. Decide what components the station will include.

2. Calculate the low, average, and high gross building costs per square feet. Including all components, except for specialties, these numbers would be:

Low:	$50.28
Average:	$54.93
High:	$64.40

3. Find the average number for Springfield, MA - 0.88. Then multiply each of the three gross building costs by this factor. Hence:

Low: $50.28 X 0.88 = $44.25
Average: $54.93 X 0.88 = $48.34
High: $64.40 X 0.88 = $56.67

These three totals represent the gross building costs per square foot for each level of the range for Springfield, Massachusetts.

GROSS BUILDING COSTS PER SQ. FT FIRE STATIONS (5,000-15,000 SF)

	LOW AVERAGE		AVERAGE		HIGH AVERAGE	
	$/SF	% TOT	$/SF	% TOT	$/SF	% TOT
Foundations	0.63	1.2	0.75	1.3	0.87	1.3
Floors on Grade	3.01	5.7	3.11	5.4	3.42	5.1
Superstructure	6.82	12.9	7.07	12.2	7.10	10.5
Roofing	1.95	3.7	1.97	3.4	2.01	3.0
Exterior Walls	10.46	19.8	11.04	19.2	12.55	18.7
Partitions	4.28	8.1	4.89	8.5	6.91	10.3
Wall Finishes	2.85	5.4	3.67	6.4	3.82	5.7
Floor Finishes	1.00	1.9	1.67	2.9	2.62	3.9
Ceiling Finishes	0.84	1.6	1.44	2.5	1.95	2.9
Conveying Systems	0.00	0.0	0.0	0.0	0.0	0.0
Specialties	2.53	4.8	2.64	4.6	2.75	4.1
Fixed Equipment	1.32	2.5	1.44	2.5	4.16	6.2
HVAC	6.45	12.2	6.90	12.0	6.91	10.3
Plumbing	2.80	5.3	3.10	5.4	3.62	5.4
Electrical	7.87	14.9	7.88	13.7	8.46	12.6
GROSS BUILDING COST	$52.81	100%	$57.57	100%	$67.15	100%

Source: Dodge Reports, 1983

LOCALITY ADJUSTMENTS

LOCATION		Labor	Mat'l	Avg	LOCATION		Labor	Mat'l	Avg
San Juan	PR	0.33	0.99	0.66	Montpelier	VT	0.77	1.09	0.93
Springfield	MA	0.85	0.91	0.88	Rutland	VT	0.52	0.92	0.72
Pittsfield	MA	0.75	0.90	0.82	Saint Johnsbury	VT	0.52	0.92	0.72
Rutland	MA	0.86	0.96	0.91	Hartford	CT	0.83	0.96	0.89
Shrewsbury	MA	0.86	0.96	0.91	New London	CT	0.82	0.98	0.90
Worcester	MA	0.86	0.96	0.91	Norwich	CT	0.74	0.95	0.84
Lowell	MA	0.86	1.06	0.96	New Haven	CT	0.92	0.97	0.94
Salem	MA	0.85	0.98	0.91	Bridgeport	CT	0.95	0.90	0.92
Boston	MA	0.98	1.17	1.07	Waterbury	CT	0.95	1.01	0.98
Waltham	MA	0.92	1.07	0.99	Torrington	CT	0.89	0.98	0.93
Brockton	MA	0.89	1.11	1.00	Greenwich	CT	1.10	1.14	1.12
New Bedford	MA	0.89	1.03	0.96	Stamford	CT	1.12	1.12	1.12
Providence	RI	0.80	1.05	0.92	Orange	NJ	0.99	0.94	0.96
Manchester	NH	0.79	0.88	0.83	Newark	NJ	0.99	0.93	0.96
Claremont	NH	0.69	0.89	0.79	Jersey City	NJ	0.99	0.99	0.99
Portsmouth	NH	0.69	1.01	0.85	Paterson	NJ	1.00	0.92	0.96
Portland	ME	0.70	0.92	0.81	Hackensack	NJ	0.93	0.94	0.93
Augusta	ME	0.73	0.93	0.83	Asbury Park	NJ	0.97	0.86	0.91
Bangor	ME	0.66	0.81	0.73	Morristown	NJ	0.92	0.94	0.93
Machias	ME	0.61	1.02	0.81	Camden	NJ	0.93	0.86	0.89
Presque Isle	ME	0.47	1.12	0.79	Wildwood	NJ	0.89	0.96	0.92
Burlington	VT	0.79	1.08	0.93	Bridgeton	NJ	0.96	0.96	0.96

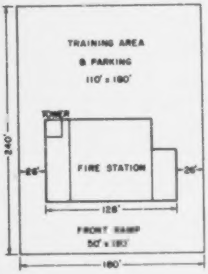
LOCATION		Labor	Mat'l	Avg
Atlantic City	NJ	0.96	0.95	0.95
Trenton	NJ	0.99	0.91	0.95
East Brunswick	NJ	0.98	0.92	0.95
Phillipsburg	NJ	0.82	0.97	0.89
New Brunswick	NJ	0.93	0.91	0.92
New York City	NY	1.15	1.01	1.08
White Plains	NY	1.00	1.02	1.01
Nassau-Suffolk	NY	0.89	1.01	0.95
Albany	NY	0.82	0.89	0.85
Schenectady	NY	0.80	0.87	0.83
Kingston	NY	0.91	0.90	0.90
Poughkeepsie	NY	0.94	0.92	0.93
Plattsburgh	NY	0.81	0.91	0.86
Syracuse	NY	0.86	1.03	0.94
Utica	NY	0.87	0.93	0.90
Watertown	NY	0.87	0.89	0.88
Binghamton	NY	0.81	0.92	0.86
Buffalo	NY	0.95	0.85	0.90
Rochester	NY	0.90	0.89	0.89
Jamestown	NY	0.93	0.93	0.93
Elmira	NY	0.83	0.92	0.87
Pittsburgh	PA	0.98	1.03	1.00
Washington	PA	0.95	0.95	0.95
Indiana	PA	0.92	0.95	0.93
Dubois	PA	0.91	0.90	0.90
Johnstown	PA	0.92	0.96	0.94
New Castle	PA	1.00	0.92	0.96
Erie	PA	0.89	0.90	0.89
Altoona	PA	0.84	0.86	0.85
Harrisburg	PA	0.82	0.84	0.83
New Holland	PA	0.70	0.80	0.75
Lancaster	PA	0.70	0.80	0.75
Williamsport	PA	0.79	0.83	0.81
Allentown	PA	0.81	0.97	0.89
Scranton	PA	0.87	0.89	0.88
Wilkes-Barre	PA	0.90	0.85	0.87
Philadelphia	PA	0.96	1.13	1.04
Reading	PA	0.80	1.04	0.92
Wilmington	DE	0.83	0.92	0.87
Dover	DE	0.83	0.93	0.88
Washington	DC	0.91	1.05	0.98
Silver Springs	MD	0.86	1.04	0.95
Baltimore	MD	0.87	1.01	0.94
Annapolis	MD	0.89	0.95	0.92
Cumberland	MD	0.81	1.00	0.90
Easton	MD	0.71	0.93	0.82
Cambrudge	MD	0.75	0.95	0.85
Hagerstown	MD	0.74	1.03	0.88
Salisbury	MD	0.75	0.95	0.85
Warrenton	VA	0.78	1.12	0.95
Winchester	VA	0.77	1.10	0.93
Charlottesville	VA	0.93	1.10	1.01
Richmond	VA	0.70	0.99	0.84
Norfolk	VA	0.69	0.92	0.80
Roanoke	VA	0.59	0.87	0.73
Lynchburg	VA	0.59	0.87	0.73
Bluefield	WV	0.74	0.93	0.83
Charleston	WV	0.96	1.09	1.02
Huntington	WV	0.95	1.07	1.01
Parkersburg	WV	0.80	0.93	0.86
Clarksburg	WV	0.84	1.00	0.92
Winston-Salem	NC	0.56	0.92	0.74
Greensboro	NC	0.52	0.91	0.71
Goldsboro	NC	0.47	0.90	0.68
Raleigh	NC	0.52	0.89	0.70
Charlotte	NC	0.60	0.89	0.74
Fayetteville	NC	0.52	0.80	0.66
Wilmington	NC	0.54	0.98	0.76
New Bern	NC	0.53	0.97	0.75
Lenoir	NC	0.34	0.82	0.58
Asheville	NC	0.39	0.85	0.62
Orangeburg	SC	0.53	0.95	0.74
Columbia	SC	0.54	0.82	0.68
Spartanburg	SC	0.36	0.84	0.60
Charleston	SC	0.53	0.90	0.71
Florence	SC	0.57	0.87	0.72
Myrtle Beach	SC	0.43	0.96	0.69
Greenville	SC	0.49	0.99	0.74
Anderson	SC	0.48	0.99	0.75
Greenwood	SC	0.49	0.99	0.74
Beaufort	SC	0.65	0.99	0.77
Rome	GA	0.68	0.78	0.73
Jackson	GA	0.73	0.89	0.81
Atlanta	GA	0.73	0.89	0.81
Gainesville	GA	0.42	0.92	0.67
Athens	GA	0.36	0.80	0.58
Augusta	GA	0.60	0.89	0.74
Macon	GA	0.54	0.84	0.69
Savannah	GA	0.63	0.94	0.78
Waycross	GA	0.31	0.94	0.62
Brunswick	GA	0.61	0.95	0.78
Valdosta	GA	0.34	0.84	0.59
Albany	GA	0.61	0.85	0.73
Columbus	GA	0.44	0.82	0.63
Daytona Beach	FL	0.71	0.84	0.77
Jacksonville	FL	0.68	0.78	0.73
Tallahassee	FL	0.60	0.81	0.70
Panama City	FL	0.49	0.82	0.65
Pensacola	FL	0.66	0.80	0.73
Gainesville	FL	0.67	0.85	0.76
Orlando	FL	0.70	0.85	0.77
Cocoa	FL	0.70	0.81	0.75
Miami	FL	0.78	0.79	0.78
Fort Lauderdale	FL	0.77	0.85	0.81
West Palm Beach	FL	0.77	0.84	0.80
Fort Pierce	FL	0.76	0.84	0.80
Sarasota	FL	0.71	0.85	0.78
Tampa	FL	0.72	0.82	0.77
Saint Petersburg	FL	0.70	0.83	0.76
Lakeland	FL	0.70	0.82	0.76
Fort Myers	FL	0.66	0.85	0.75
Naples	FL	0.69	0.87	0.78
Birmingham	AL	0.73	0.86	0.79
Tuscaloosa	AL	0.62	0.85	0.73

LOCATION		Labor	Mat'l	Avg
Florence	AL	0.65	0.96	0.80
Huntsville	AL	0.65	0.86	0.75
Gadsden	AL	0.65	0.80	0.72
Montgomery	AL	0.65	0.78	0.71
Anniston	AL	0.72	0.84	0.78
Ashland	AL	0.72	0.84	0.78
Dothan	AL	0.52	1.09	0.80
Mobile	AL	0.73	0.87	0.80
Selma	AL	0.59	0.85	0.72
Clarksville	TN	0.69	0.86	0.77
Nashville	TN	0.70	0.78	0.74
Chattanooga	TN	0.73	0.79	0.76
Johnson City	TN	0.59	0.85	0.72
Kingsport	TN	0.59	0.84	0.71
Knoxville	TN	0.65	0.81	0.73
Memphis	TN	0.80	0.81	0.80
Jackson	TN	0.55	0.83	0.69
Columbia	TN	0.47	0.94	0.70
Clarksdale	MS	0.54	1.01	0.77
Greenville	MS	0.53	0.95	0.74
Tupelo	MS	0.60	0.93	0.76
Greenwood	MS	0.40	1.03	0.71
Natchez	MS	0.50	0.93	0.71
Jackson	MS	0.69	0.89	0.79
Meridian	MS	0.47	0.90	0.68
Hattiesburg	MS	0.66	1.07	0.86
Gulfport	MS	0.65	0.92	0.78
Columbus	MS	0.49	0.85	0.67
Louisville	KY	0.85	0.79	0.82
Lexington	KY	0.81	0.86	0.83
Covington	KY	1.01	0.88	0.94
Ashland	KY	0.89	0.84	0.86
Pikesville	KY	0.66	1.23	0.94
Paducah	KY	0.70	0.95	0.82
Bowling Green	KY	0.56	0.83	0.69
Owensboro	KY	0.77	0.91	0.84
Madisonville	KY	0.67	0.84	0.75
Elizabethtown	KY	0.57	0.90	0.73
Columbus	OH	0.91	0.98	0.94
Toledo	OH	0.99	1.01	1.00
Zanesville	OH	0.88	0.89	0.88
Steubenville	OH	0.81	0.90	0.85
Painesville	OH	1.01	0.92	0.96
Cleveland	OH	1.15	1.12	1.13
Akron	OH	0.91	1.01	0.96
Warren	OH	0.92	0.88	0.90
Youngstown	OH	0.92	0.88	0.90
Canton	OH	0.85	1.11	0.98
Sandusky	OH	1.01	1.05	1.03
Mansfield	OH	0.97	0.94	0.95
Decatur	OH	0.87	0.84	0.85
Cincinnati	OH	1.01	0.88	0.94
Xenia	OH	0.89	0.86	0.87
Dayton	OH	0.89	0.84	0.86
Portsmouth	OH	0.94	0.85	0.89
Athens	OH	0.67	0.91	0.79
Lima	OH	0.93	0.91	0.92
Indianapolis	IN	0.90	1.06	0.98
Gary	IN	0.91	0.93	0.92
South Bend	IN	0.92	0.86	0.89
Fort Wayne	IN	0.79	1.03	0.91
Kokomo	IN	0.74	0.97	0.85
New Albany	IN	0.82	0.84	0.83
Greensburg	IN	0.89	0.92	0.90
Muncie	IN	0.80	0.89	0.84
Richmond	IN	0.83	0.91	0.87
Bloomington	IN	0.81	0.87	0.84
Evansville	IN	0.92	0.95	0.93
Terre Haute	IN	0.82	0.94	0.88
Lafayette	IN	0.84	0.91	0.87
Port Huron	MI	1.00	1.05	1.02
Ann Arbor	MI	1.10	1.12	1.11
Detroit	MI	1.10	1.12	1.11
Flint	MI	1.06	1.07	1.06
Lansing	MI	0.89	0.95	0.92
Kalamazoo	MI	0.83	0.99	0.91
Muskegon	MI	0.87	1.01	0.94
Grand Rapids	MI	0.82	0.97	0.89
Traverse City	MI	0.79	1.02	0.90
Alpena	MI	0.83	1.00	0.91
Petosky	MI	0.79	1.04	0.91
Sault Sainte Marie	MI	0.79	0.97	0.88
Marquette	MI	0.78	1.01	0.89
Ironwood	MI	0.72	1.03	0.87
Marshalltown	IA	0.73	1.03	0.88
Des Moines	IA	0.85	0.93	0.89
Mason City	IA	0.71	1.01	0.86
Fort Dodge	IA	0.81	1.01	0.91
Waterloo	IA	0.77	1.06	0.91
Creston	IA	0.66	1.07	0.86
Sioux City	IA	0.82	0.89	0.85
Spencer	IA	0.62	0.92	0.77
Council Bluffs	IA	0.84	0.89	0.86
Dubuque	IA	0.79	0.97	0.88
Cedar Rapids	IA	0.90	0.93	0.91
Ottumwa	IA	0.84	0.84	0.84
Burlington	IA	0.85	1.06	0.95
Davenport	IA	0.90	0.92	0.91
Sheboygan	WI	0.87	0.89	0.88
Milwaukee	WI	0.97	1.09	1.03
Janesville	WI	0.85	0.88	0.86
Madison	WI	0.82	0.91	0.86
Marinette	WI	0.87	0.91	0.89
Green Bay	WI	0.83	0.94	0.88
Wausau	WI	0.77	0.85	0.81
Rhinelander	WI	0.83	0.99	0.91
La Crosse	WI	0.85	1.18	1.01
Eau Claire	WI	0.83	0.97	0.90
Rice Lake	WI	0.78	1.02	0.90
Fond Du Lac	WI	0.82	0.97	0.89
Minneapolis	MN	0.98	1.11	1.04
Virginia	MN	0.93	1.10	1.01
Duluth	MN	0.89	0.97	0.93
Rochester	MN	0.90	1.02	0.96

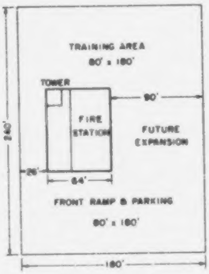
LOCATION		Labor	Mat'l	Avg
Winona	MN	0.89	0.98	0.93
Mankato	MN	0.81	0.90	0.85
Saint Cloud	MN	0.88	0.97	0.92
Brainerd	MN	0.78	0.88	0.83
Yankton	SD	0.66	0.90	0.78
Sioux Falls	SD	0.71	0.91	0.81
Watertown	SD	0.67	0.96	0.81
Chamberlain	SD	0.71	0.92	0.81
Huron	SD	0.68	0.95	0.81
Aberdeen	SD	0.45	0.96	0.70
Pierre	SD	0.43	1.11	0.77
Rapid City	SD	0.61	1.00	0.80
Fargo	ND	0.70	0.98	0.84
Grand Forks	ND	0.61	1.00	0.80
Jamestown	ND	0.66	0.91	0.78
Bismarck	ND	0.70	1.00	0.85
Minot	ND	0.72	0.95	0.83
Williston	ND	0.46	1.05	0.75
Billings	MT	0.85	0.87	0.86
Miles City	MT	0.75	1.05	0.90
Great Falls	MT	0.87	0.93	0.90
Havre	MT	0.85	0.95	0.90
Helena	MT	0.83	0.88	0.85
Butte	MT	0.82	0.96	0.89
Missoula	MT	0.92	0.93	0.92
Kalispell	MT	0.83	0.86	0.84
Glencoe	IL	0.99	0.85	0.92
Skokie	IL	0.99	0.85	0.92
Waukegon	IL	0.97	0.97	0.97
Winnetka	IL	0.99	0.85	0.92
Evanston	IL	0.96	0.94	0.95
Joliet	IL	0.97	0.98	0.97
Aurora	IL	0.90	0.98	0.94
Chicago	IL	1.00	0.85	0.92
Kankakee	IL	1.05	1.00	1.02
Freeport	IL	0.94	0.99	0.96
Rockford	IL	0.94	0.97	0.95
Rock Island	IL	0.92	0.92	0.92
Moline	IL	0.91	0.92	0.91
Galesburg	IL	0.92	1.01	0.96
Peoria	IL	0.99	0.95	0.97
Champaign	IL	0.90	0.95	0.92
Alton	IL	0.95	1.00	0.97
Belleville	IL	0.95	0.92	0.93
Quincy	IL	0.88	0.87	0.87
Springfield	IL	0.95	0.95	0.95
Centralia	IL	0.87	0.98	0.92
Carbondale	IL	0.85	0.89	0.87
Saint Louis	MO	0.98	0.82	0.90
Montgomery	MO	0.82	0.86	0.84
New Hartford	MO	0.85	0.89	0.87
Hannibal	MO	0.75	0.87	0.81
Kirksville	MO	0.58	1.00	0.79
Cape Giradeau	MO	0.81	0.93	0.87
Poplar Bluff	MO	0.75	0.90	0.82
Kansas City	MO	0.95	0.85	0.90
Saint Joseph	MO	0.79	0.81	0.80
Chillicothe	MO	0.60	0.85	0.72
Clinton	MO	0.95	0.85	0.90
Joplin	MO	0.81	0.92	0.86
Jefferson City	MO	0.79	0.84	0.81
Columbia	MO	0.82	0.86	0.84
Rolla	MO	0.85	0.89	0.87
Springfield	MO	0.69	0.89	0.79
Kansas City	KS	0.94	0.84	0.89
Topeka	KS	0.80	0.98	0.89
Emporia	KS	0.90	0.93	0.91
Arkansas City	KS	0.57	0.95	0.76
Wichita	KS	0.75	0.81	0.78
Independence	KS	0.61	0.86	0.73
Salina	KS	0.67	0.84	0.75
Dodge City	KS	0.41	0.82	0.61
Garden City	KS	0.50	0.99	0.74
Omaha	NB	0.83	0.89	0.86
Lincoln	NB	0.70	0.86	0.78
Columbus	NB	0.63	0.92	0.77
Norfolk	NB	0.61	0.96	0.78
Grand Island	NB	0.49	0.84	0.66
Kearney	NB	0.51	0.99	0.75
North Platte	NB	0.55	0.92	0.73
Scottsbluff	NB	0.54	0.95	0.74
New Orleans	LA	0.78	0.91	0.84
Houma	LA	0.72	1.03	0.87
Hammond	LA	0.65	0.98	0.81
Bogalusa	LA	0.64	1.34	0.99
Lafayette	LA	0.75	0.92	0.83
New Iberia	LA	0.74	0.91	0.82
Lake Charles	LA	0.83	0.98	0.90
Baton Rouge	LA	0.73	0.85	0.79
Shreveport	LA	0.69	0.90	0.79
Monroe	LA	0.69	0.92	0.80
Alexandria	LA	0.50	0.99	0.74
Pine Bluff	AR	0.67	0.83	0.75
Eldorado	AR	0.74	0.80	0.77
Hot Springs	AR	0.65	0.87	0.76
Little Rock	AR	0.68	0.86	0.77
Forest City	AR	0.55	0.86	0.70
Jonesboro	AR	0.56	0.91	0.73
Batesville	AR	0.43	0.76	0.59
Fayetteville	AR	0.60	0.86	0.73
Fort Smith	AR	0.65	0.90	0.77
Oklahoma City	OK	0.79	0.86	0.82
Ardmore	OK	0.70	0.99	0.84
Lawton	OK	0.63	0.89	0.76
Clinton	OK	0.65	0.99	0.82
Enid	OK	0.74	0.96	0.85
Bartlesville	OK	0.72	1.01	0.86
Stillwater	OK	0.77	0.96	0.86
Tulsa	OK	0.76	0.84	0.80
Muskogee	OK	0.70	1.00	0.85
McAlester	OK	0.63	0.95	0.79
Hugo	OK	0.48	0.85	0.66
Sherman	TX	0.61	0.78	0.69
Dallas	TX	0.84	0.90	0.87

LOCATION		Labor	Mat'l	Avg
Texarkana	TX	0.63	0.88	0.75
Tyler	TX	0.56	0.88	0.72
Nacogdoches	TX	0.50	0.90	0.70
Bridgeport	TX	0.84	0.95	0.89
Wichita Falls	TX	0.69	0.91	0.80
Waco	TX	0.63	0.85	0.74
San Angelo	TX	0.56	0.87	0.71
Houston	TX	0.90	0.85	0.87
Beaumont	TX	0.87	0.85	0.86
San Antonio	TX	0.73	0.89	0.81
Corpus Christi	TX	0.60	0.93	0.76
Brownsville	TX	0.49	0.98	0.73
Harlingen	TX	0.49	0.96	0.72
Austin	TX	0.74	0.90	0.82
Del Rio	TX	0.39	0.98	0.68
Amarillo	TX	0.68	0.95	0.81
Lubock	TX	0.57	0.85	0.71
Abilene	TX	0.57	1.02	0.79
Odessa	TX	0.58	0.84	0.71
El Paso	TX	0.58	0.94	0.76
Denver	CO	1.02	1.05	1.03
Fort Collins	CO	0.97	1.02	0.99
Sterling	CO	0.95	1.03	0.99
Colorado Springs	CO	0.93	1.08	1.00
Pueblo	CO	0.85	1.02	0.93
La Junta	CO	0.77	0.97	0.87
Trinidad	CO	0.74	0.97	0.85
Montrose	CO	0.88	0.94	0.91
Grand Junction	CO	0.88	0.96	0.92
Cheyenne	WY	0.88	1.29	1.08
Thermopolis	WY	0.73	1.20	0.96
Casper	WY	0.89	1.01	0.95
Gillette	WY	0.95	1.01	0.98
Sheridan	WY	0.93	1.00	0.96
Rock Springs	WY	0.93	1.18	1.05
Pocatello	ID	0.88	0.95	0.91
Twin Falls	ID	0.81	1.03	0.92
Idaho Falls	ID	0.89	0.92	0.90
Lewiston	ID	1.02	1.02	1.02
Boise	ID	0.84	0.89	0.86
Kellogg	ID	1.05	0.91	0.98
Salt Lake City	UT	0.86	0.86	0.86
Ogden	UT	0.86	0.88	0.87
Provo	UT	0.85	0.92	0.88
Cedar City	UT	0.78	0.83	0.80
Phoenix	AZ	0.89	1.11	1.00
Yuma	AZ	0.81	1.10	0.95
Douglas	AZ	0.82	0.99	0.90
Tucson	AZ	0.86	0.97	0.91
Flagstaff	AZ	0.98	1.17	1.07
Prescott	AZ	0.96	1.06	1.01
Kingman	AZ	0.54	1.02	0.78
Albuquerque	NM	0.78	0.96	0.87
Gallup	NM	0.85	0.95	0.90
Farmington	NM	0.74	1.01	0.87
Santa Fe	NM	0.72	0.93	0.82
Las Cruces	NM	0.57	1.01	0.79
Clovis	NM	0.75	1.06	0.90
Roswell	NM	0.74	1.01	0.87
Hobbs	NM	0.70	1.04	0.87
Las Vegas	NV	1.13	0.91	1.02
Reno	NV	1.13	0.99	1.06
Elko	NV	1.14	1.11	1.12
Los Angeles	CA	1.21	1.17	1.19
Santa Monica	CA	1.19	1.11	1.15
Glendale	CA	1.10	0.97	1.03
Encino	CA	1.21	1.13	1.17
Van Nuys	CA	1.21	1.13	1.17
San Diego	CA	1.10	1.19	1.14
Palm Springs	CA	1.17	0.94	1.05
Barstow	CA	1.15	1.02	1.08
San Bernardino	CA	1.15	0.97	1.06
Santa Barbara	CA	1.21	1.18	1.19
Visalia	CA	1.12	1.00	1.06
Bakersfield	CA	1.08	1.02	1.05
San Luis Obispo	CA	1.21	1.13	1.17
Santa Maria	CA	1.21	1.13	1.17
Bishop	CA	1.07	1.13	1.10
Fresno	CA	1.15	1.19	1.17
Salinas	CA	1.21	1.11	1.16
Monterey	CA	1.20	1.09	1.14
Redwood City	CA	1.24	1.05	1.14
San Bruno	CA	1.24	1.06	1.15
San Francisco	CA	1.41	1.00	1.20
Saint Helena	CA	1.13	1.00	1.06
San Jose	CA	1.19	1.07	1.13
Stockton	CA	1.18	1.13	1.15
Santa Rosa	CA	1.13	1.00	1.06
Eureka	CA	1.14	1.02	1.08
Vacaville	CA	1.13	1.00	1.06
Winters	CA	1.20	1.00	1.10
Sacramento	CA	1.20	1.00	1.10
Chico	CA	1.16	1.03	1.09
Redding	CA	1.15	1.02	1.08
Susanville	CA	1.14	1.03	1.08
Honolulu	HI	1.03	1.30	1.16
The Dalles	OR	1.08	0.95	1.01
Astoria	OR	1.08	0.95	1.01
Portland	OR	1.08	0.98	1.03
Salem	OR	1.07	1.05	1.06
Eugene	OR	1.02	0.87	0.94
Medford	OR	0.84	1.05	0.94
Bend	OR	0.93	0.96	0.94
Pendelton	OR	0.78	1.05	0.91
Seattle	WA	1.16	1.12	1.14
Bellingham	WA	0.93	0.88	0.90
Bremerton	WA	1.09	0.98	1.03
Tacoma	WA	1.09	0.97	1.03
Aberdeen	WA	1.14	1.01	1.07
Vancouver	WA	1.11	0.96	1.03
Wenatchee	WA	0.93	0.96	0.94
Yakima	WA	0.95	0.87	0.91
Spokane	WA	1.02	0.83	0.92
Pasco	WA	0.98	0.95	0.96

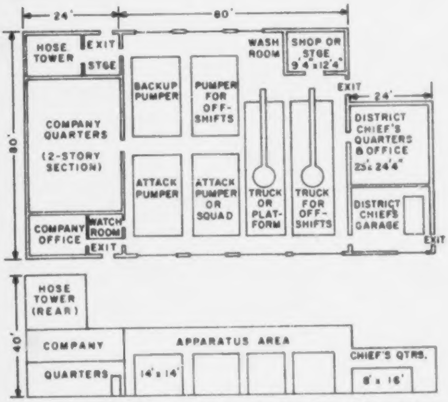
LOCATION		Labor	Mat'l	Avg
Richland	WA	0.98	0.98	0.98
Anchorage	AK	1.42	1.45	1.43
Fairbanks	AK	1.42	1.53	1.47
Juneau	AK	1.41	1.35	1.38
Ottawa	ONT	0.83	0.87	0.85
Toronto	ONT	0.84	0.87	0.85
Windsor	ONT	0.84	0.87	0.85
Vancouver	BC	0.96	0.82	0.89
Winnipeg	MAN	0.79	0.87	0.83
Regina	SASK	0.80	0.88	0.84
Quebec City	QB	0.73	0.83	0.78
Montreal	QB	0.73	0.84	0.78
Halifax	NS	0.68	0.94	0.81
Edmonton	AB	0.86	0.83	0.84
Brandon	MAN	0.79	0.87	0.83
Calgary	AB	0.86	0.84	0.85


TRAINING AREA
& PARKING
110' x 180'
TOWER
240'
26'
FIRE STATION
26'
128'
FRONT RAMP
50' x 180'
180'

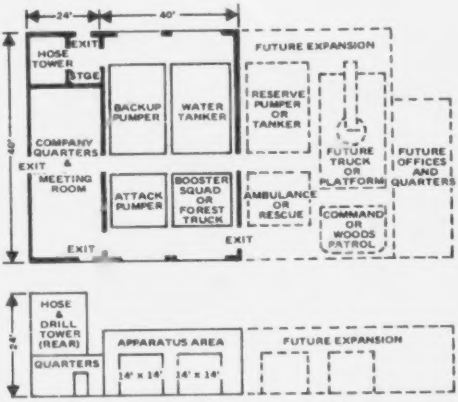
Plot plan for a typical district fire station for urban and suburban services. Minimum recommended plot size is 43,200 sq.ft.


TRAINING AREA
80' x 180'
TOWER
90'
FIRE STATION
FUTURE EXPANSION
240'
26'
64'
FRONT RAMP & PARKING
80' x 180'
180'

Plot plan for a typical rural fire station. Minimum recommended plot size is 43,200 sq. ft.


24'
80'
HOSE TOWER
EXIT
STGE
WASH ROOM
SHOP OR STGE 9'4" x 12'4"
EXIT
24'
BACKUP PUMPER
PUMPER FOR OFF-SHIFTS
COMPANY QUARTERS (2-STORY SECTION)
DISTRICT CHIEF'S QUARTERS & OFFICE 25' x 24'4"
80'
ATTACK PUMPER
ATTACK PUMPER OR SQUAD
TRUCK OR PLAT-FORM
TRUCK FOR OFF-SHIFTS
DISTRICT CHIEFS GARAGE
COMPANY OFFICE
WATCH ROOM
EXIT
EXIT
HOSE TOWER (REAR)
40'
COMPANY
APPARATUS AREA
CHIEF'S QTRS.
QUARTERS
14' x 14'
8' x 16'

Elevation and plan view of a typical urban fire station.


24'
40'
HOSE TOWER
EXIT
STGE
FUTURE EXPANSION
BACKUP PUMPER
WATER TANKER
RESERVE PUMPER OR TANKER
40'
COMPANY QUARTERS & MEETING ROOM
EXIT
FUTURE TRUCK OR PLATFORM
FUTURE OFFICES AND QUARTERS
ATTACK PUMPER
BOOSTER SQUAD OR FOREST TRUCK
AMBULANCE OR RESCUE
COMMAND OR WOODS PATROL
EXIT
EXIT
HOSE & DRILL TOWER (REAR)
24'
APPARATUS AREA
FUTURE EXPANSION
QUARTERS
14' x 14'
14' x 14'

Elevation and plan view of a typical rural fire station.

Fire Department Apparatus and Equipment

The selection and purchase of apparatus is both difficult and critical for fire departments. Much planning and evaluation is necessary to determine which types of equipment will best serve the department within the parameters of its budget. Consulting NFPA 1901, *Standard for Automotive Fire Apparatus*, is a good place to begin since the information in this standard applies to new, used, and "build-it-yourself" type fire apparatus.

In the United States, there are more than 100 manufacturers of fire apparatus. A list of those builders who are members of the Fire Apparatus Manufacturers Division of the Truck Body and Equipment Association is included here. The companies listed provide basic specifications, blueprints, and recommendations on the various types, designs, costs, and variety of equipment available on new apparatus. In addition, they can often provide source information about available "used" apparatus.

Fire Apparatus Manufacturers

(A) Apparatus Builder
(C) Chassis Builder
(S) Supplier

Akron Brass Company (S)
P.O. Box 86
Wooster, OH 44691
(216) 264-5678

Alexis Fire Equipment Company (A)
1209 E. Broadway
P.O. Box 425
Alexis, IL 61412
(309) 482-6121

Aluminum Ladder Company (S)
P.O. Box 5329
Florence, SC 29502
(803) 662-2595

American LaFrance (A)
100 E. LaFrance St.
Elmira, NY 14904
(607) 734-8181

American Modular Body Corporation (S)
18 Industrial Dr.
Smithfield, RI 02917
(401) 231-0380

Atlas Steel Products Company, Inc. (A)
1818 New Hope Church Rd.
P.O. Box 17246
Raleigh, NC 27619
(919) 876-2321

The Boardman Company (A)
1401 SW 11th St.
P.O. Box 26088
Oklahoma City, OK 73126
(405) 634-5434

Boston Industrial Products, Inc. (S)
P.O. Box 168
Hohenwald, TN 38462
(615) 796-3272

Brumbaugh Body Company, Inc. (A)
100 W. Plank Rd.
Altoona, PA 16602
(814) 944-6103

Crown Coach Corporation (A)
Fire Coach Division
2500 E. 12th St.
Los Angeles, CA 90021
(213) 627-4021

W. S. Darley & Company (A)
2000 Anson Dr.
Melrose Park, IL 60160
(312) 345-8050

Duo-Safety Ladder Corporation (S)
513 W. 9th Ave.
P.O. Box 497
Oshkosh, WI 54902
(414) 231-2740

Duplex Truck Division/The Nolan Company (C)
P.O. Box 295
Midvale, OH 44653
(614) 922-5955

Elkhart Brass Manufacturing Company, Inc. (S)
1302 W. Beardsley Ave.
P.O. Box 1127
Elkhart, IN 46515
(219) 295-8330

Emergency One, Inc. (A)
1701 SW 37th Ave.
Ocala, FL 32671
(904) 237-1122

FMC Corporation (A)
Fire Apparatus Operation
516 Dearborn St.
Tipton, IN 46072
(317) 675-2185

Feecon Corporation (S)
One Walkup Dr.
P.O. Box 338
Westboro, MA 01581
(617) 366-9137

Fire Apparatus Division of Collins Industries, Inc. (A)
P.O. Box 58
Hutchinson, KS 67501
(316) 633-4441

Fire Appliance Company of Texas (A)
1708 E. Scott
Wichita Falls, TX 76303
(817) 766-0642

Fire Research Corporation (S)
26 Southern Blvd.
Nesconset, NY 11767
(516) 724-8888

Fire Trucks, Inc. (A)
80 N. Rose St.
Mt. Clemens, MI 48043
(313) 568-7532

Ford Motor Company (C)
Ford Division/Heavy Truck Sales
300 Ren-Cen
P.O. Box 43308
Detroit, MI 48243
(313) 568-7532

General Safety Equipment Corp. (A)
550 Eighth Ave.
P.O. Box 249
North Branch, MN 55056
(612) 674-4804

Gibson Motor & Machine Service, Inc. (A)
16 Broadway Ave.
Lawrence, MA 01841
(617) 682-4715

Grumman Emergency Products, Inc. (A)
1723 Seibel Dr., N.E.
Roanoke, VA 24012
(703) 982-6666

Hale Fire Pump Company (S)
700 Spring Mill Ave.
Conshohocken, PA 19428
(215) 825-6300

Clifford B. Hannay & Son, Inc. (S)
600 E. Main St.
Westerlo, NY 12193
(518) 597-3791

Hendrickson Mobile Equipment (C&S)
8001 W. 47th St.
Lyons, IL 60534
(312) 447-4600

Imperial Fire Hose Company (S)
8668 NW S. River Dr.
Miami, FL 33166
(305) 883-7997

Jaco Industries, Inc. (A)
661 Pillans St.
Mobile, AL 36603
(205) 432-5000

Ladder Towers, Inc. (A)
RD2, Cocalico Creek Rd.
Ephrata, PA 17522
(717) 859-1176

Mack Trucks, Inc. (C&A)
Fire Apparatus Division (5N1)
Box M
Allentown, PA 18105
(215) 439-3011

National Foam System, Inc.
150 Gordon Dr.
Lionville, PA 19353
(215) 363-1400

Oshkosh Truck Corporation (C&A)
P.O. Box 2566
Oshkosh, WI 54903
(414) 235-9150

Pemberton Fabricators, Inc. (C)
Chassis Division
30 Indel Ave.
Rancocas, NJ 08073
(609) 267-0922

Pierce Manufacturing Inc. (A)
315 S. Pierce Ave.
Appleton, WI 54911
(414) 731-5251

Peter Prisch & Sons Company
1308 35th St.
Kenosha, WI 53140
(414) 658-8141

Saulsbury Fire Equipment Company (A)
Community Drive, P.O. Box 430
Tully, NY 13159
(315) 696-8909

Seagrave Fire Apparatus, Inc. (C&A)
105 E. 12th St.
Clintonville, WI 54929
(715) 823-3194

Smeal Fire Equipment Company (A)
Snyder, NE 68664
(402) 568-2221

Snorkel Division of A-T-O Inc. (A)
P.O. Box 65, Stockyards Station
St. Joseph, MO 64504
(913) 989-4481

Span Instruments, Inc. (A)
1947 Ave. "K"
P.O. Box 709
Plano, TX 75074
(214) 423-5320

Spartan Motors Inc. (C)
1000 Reynolds Rd.
P.O. Box 440
Charlotte, MI 48813
(517) 543-6400

Sutphen Corporation (A)
7000 Columbus-Marysville Rd.
Amlin, OH 43002
(614) 889-1005

Towers Fire Apparatus Company, Inc. (A)
502 S. Richland St.
Freeburg, IL 62243
(618) 539-3863

Truck Cab Manufacturing, Inc. (S)
2420 Anderson Ferry Rd.
Cincinnati, OH 45238
(513) 922-1300

Universal Fire Apparatus Corporation (A)
613 Center St.
Logansport, IN 46947
(219) 753-3223

Waterous Company (S)
300 John E. Carroll Ave., E
South St. Paul, MN 55075
(612) 450-5000

Westates Truck Equipment Corporation (A)
3641 Haven Ave.
P.O. Box 2183
Menlo Park, CA 94025
(415) 364-4500

Western States Fire Apparatus, Inc. (A)
1389 Baseline
Box 646
Cornelius, OR 97113
(503) 357-2163

Price Range for Fire Department Apparatus (1983)

NFPA surveyed several fire apparatus manufacturers to determine the current price range for a variety of apparatus. The following figures represent the results of that survey. Price ranges are exclusive of allowances for any required ancillary equipment, except that which is provided as standard.

Approximate Costs

Custom Pumper: $110,000 — $150,000. Apparatus completely built by one company, including chassis, frame, truck body, etc.

Commercial Pumper: $66,000 — $125,000. Apparatus where chassis is built by one company and compartments, hose, body, by another.

100′ Aerial Elevated Platform: $280,000 — $380,000. Quintuple pump, water tank, hose body.

100′ Tractor-trailer Aerial: $250,000 — $325,000.

100′ Aerial - Pre-pipe: $300,000 — $325,000. Full quintuple pump, water tank, hose body.

100′ Straight Axle Aerial: $230,000 — $280,000. Quintuple pump, water tank.

100′ Straight Axle Aerial: $185,000 — $210,000.

100′ Rear Mount Aerial: $200,000 — $290,000.

100′ Midship Aerial: $175,000 — $250,000.

85′ Aerial Elevated Platform: $300,000 — $360,000. Full quintuple.

85′ Straight Axle Aerial: $185,000 — $200,000.

75′ Aerial Elevated Platform: $225,000 — $250,000. Full quintuple.

75′ Straight Axle Aerial: $175,000 — $195,000.

55′ Elevated Water Stream: $170,000 — $180,000, Custom chassis; $140,000 — $150,000 Commercial chassis.

PRICE RANGES FOR FIRE EQUIPMENT

The following price ranges are as of mid-1983. Due to the constant fluctuation in prices, however, all prices listed here are subject to change. In addition, these prices represent single unit pricing; no adjustments have been made for competitive bidding or quantity discounts.

Item	Price (in U.S. $)
PROTECTIVE CLOTHING	
Coats (NFPA 7.5 Nomex)	$168-195.00 plus accessories
Pants	116-164.00
Boots (Insulated)	
Day	75-79.00
Nite	49-64.00
Helmets	
660 metro c	73.00
660-72 Phoenix	73.00
Gloves	
Leather w/Nomex or Kevlar Wristlet	17-39.50
Hoods (Nomex aramid fiber)	21-26.50
Proximity Suit	750-1175.00
Fire Chemical Suit	700-1630.00
Entry Suit	1350.00
Self-Contained Breathing Apparatus	
Positive Pressure 30 minute Service life	850-1300.00
Positive Pressure 60 minute Service life	1400.00
Closed Circuit 60 minute Service life	1300-1500.00
Personal Distress Device	68-125.00
TOOLS	
Axe 6 lb. pickhead wood	$25-29.00
Axe 6 lb. pickhead fiberg	53-95.00
Axe 6 lb. flathead wood	24-28.00
Axe 6 lb. flathead fiberg	55.00
Battering Ram 50 lb.	140-165.00
Bolt Cutters (Heavy Duty)	54-160.00
Crash Axe	45-47.00
Crash Axe 9 lb. fiber	130.00
Crowbar	15-40.00
Hooligan (Halligan) Bar	85-95.00
Huxbar	96.00
N.Y. State Lock Breaker	190.00
Pichbar (4 ft)	15.00
Quic-Bar®	110.00
Sledge Hammer fiber	33-46.00
Sledge Hammer wood	25-34.00
Utility Bar	45.00
Wire Cutters (20,000v)	80-130.00
K Tool Lock Puller	95.00
Meter Wrench	27.00
Bailing Hook	3-7.00
Car Opening Tool	15.00
V-Blade Rescue Knife	30-33.00
Squeegees	20-55.00
Chimney Scraper	65-103.00
Salvage Covers (various sizes)	75-186.00
Water Vacuum 5 gal backpack	641.00
Water Vacuum 15 gal w/ squeegee	749.00
Water Drag & Rescue Outfit	430.00
Grapnel Hook	100-165.00
Ice Drill	48.00

Item	Price (in U.S. $)
Ice Chisel Bar	20.00
Pike Poles (6-20 ft)	
wood	32-78.00
fiberg	50-117.00
wood core fiberg	80-190.00
alum	45-115.00
Electric Hacksaw variable speed w/case	175.00
Rescue Saw (Gasoline)	725-1050.00
Rescue Cutting Torch	675-700.00
Air Hammer Rescue Kit	283.00
Air Bag System (50T)	1850.00
Air Bag System (117T)	3325.00
Hydraulic IOT Rescue Kit	1450-1620.00
Portable Generators	1150-2800.00
Portable Quartz Floodlight	150-175.00
Portable Cable Reels	49-90.00
Portable Floodlight (Circle D)	105-155.00
Smoke Ejector (gas or elec.)	345-985.00
Lantern (battery)	19-60.00
Lantern (rechargable)	39-172.00
Lantern (wet cell battery rechargable)	92-130.00
Flashlight (rechargable)	57.50-130.00
Wheel Chock	28-75.00
Hose Clamp	99-275.00
Hose Jacket	235-278.00
Hose Hoist	110-115.00
Rope Winder	90.00
Hose Strap	9-12.00
Hose Dryer (Elec.)	4500.00
Hose Dryer (Gas)	5000.00
Hose Washer	4260.00
Hose Loading Table	400.00
Hose Bridge (alum) for 4 in. hose (set of 2)	840.00
Hose Bridge (rubber) for 5 in. hose (set of 2)	675.00
Hydrant Wrench	15-30.00
Hydrant Wrench (Rachet)	113-130.00
Life Belts	90-117.00
HOSE	
Sierra Poly (DJ) 50 ft w/ lightweight couplings	
1 ½ in.	$80.00
1 ¾ in.	92.00
2 ½ in.	123.50
3 in.	167.50
3 ½ in.	281.00
Argus Red Chief (SJ) 50 ft w/couplings	
1 ½ in.	187.00
1 ¾ in.	202.00
2 in.	218.00
2 ½ in.	263.00
3 in.	292.00
Snap-Tite Duralight 100 ft w/storz couplings	
4 in.	650.00
5 in.	874.00
Angus 100 ft w/ storz couplings	
4 in.	697.00
5 in.	933.00
Hard Suction (corrugated w/lightweight couplings)	
4 ½ in. - 10 ft	447.00
6 in. - 10 ft	690.00

Item	Price (in U.S. $)
Basket Strainer (cast alum)	
4 ½ in.	75-96.00
6 in.	90-124.00
Brass Strainer	
4 ½ in.	144.00
6 in.	179.00
Float Dock Strainer (brass)	
4 ½ in.	407.00
5 in.	434.00
Pitot Gage w/case	115.00
Life Net w/cover	1100.00
DESCENT SYSTEM	
w/ 100 ft nylon line	219.00
w/ 200 ft nylon line	273.00
w/ 400 ft nylon line	364.00
LADDERS (Aluminum)	
"A" Ladder	$275-336.00
Attic Ladder (10-14 ft)	218-275.00
Folding Ladder (8-14 ft)	120-170.00
Straight Wall Ladder	
16 ft	275-285.00
20 ft	343-349.00
24 ft	403-428.00
Roof Ladder	
12 ft	264.00
14 ft	244-285.00
20 ft	318-380.00
Extension Ladder	
2 Section, 24 ft	550-558.00
2 Section, 35 ft	739-835.00
3 Section, 35 ft	910-1035.00
3 Section, 40 ft w/poles	1350.00
3 Section, 50 ft w/poles	1560.00
NOZZLES (Playpipe-Shutoff)	
Adjustable gallonage-Adjustable stream	
1 ½ in. (40-60-95-125)	$341-467.00
2 ½ in. (125-175-250)	450-740.00
Variable gallonage-Constant pressure	
1 ½ in.	495-565.00
2 ½ in. w/accessories	550-775.00
Solid Stream	
1 ½ in.	93-127.00
2 ½ in.	351-450.00
DECK GUN	
Stang (Complete)	$1650.00
2 & 3 Inlet Monitors	1425-2550.00
PORTABLE PUMPS (Skid Mount)	
11-18 Hp	$2300-6300.00
FOAMS/CHEMICALS	
AFFF (per gal)	$12-24.00
Hi-Expansion (per gal)	10.50
6% Protein (per gal)	9.00
3% Protein (per gal)	10.25
6% Fluoroprotein (per gal)	10-10.50
3% Fluoroprotein (per gal)	11.50-13.00
Alcohol Low Expansion (per gal)	14.00
"Slippery Water" 5 gal	58.00
Wetting Agent 5 gal	68.50

Item	Price (in U.S. $)
FITTINGS (lightweight)	
Plain wye (2 ½ F X 2 ½ M X 2 ½ M)	$134-143.00
Gated wye (2 ½ F X 2 ½ M X 2 ½ M)	575-614.00
Water Thief (2 ½ F X 1 ½ M X 2 ½ M X 1 ½ M)	619-647.00
Leader Line Gated Wye (2 ½ F X 1 ½ M X 1 ½ M)	284.00
Clappered Siamese (2 ½ M X 2 ½ F X 2 ½ F)	185-280.00
Plain Siamese (2 ½ M X 2 ½ F X 2 ½ F)	134-168.00
Double male (1 ½ x 1 ½)	15.50-21.50
Double male (2 ½ x 2 ½)	20-26.00
Double female (1 ½ x 1 ½)	23.50-35.50
Double female (2 ½ x 2 ½)	36-40.00
Reducer (2 ½ F x 2 ½ M)	19-25.00
SALVAGE COVERS	
Duck 12 in. x 14 in.	$124.00
Duck 14 in. x 18 in.	186.00
Nylon 12 in. x 14 in.	89.00
Nylon 14 in. x 18 in.	133.00
EXTINGUISHERS	
ABC (20A:120 BC rating) 20 lb.	$71-132.00
Halon 1211 (2A:60 BC rating)	128-238.00
CO^2 (10 BC rating) 20 lb.	163-210.00
Class D	256.50
Stored Pressure-Water Type (2A rating)	46-52.00
Stored Pressure-Water Type AFFF (3A:40B rating)	103.00
GAS DETECTORS (Portable)	$180-539.00
PORTABLE FOLDING WATER TANKS	
Hypalon 20 oz.	
1000 gal	$895.00
1500 gal	1080.00
2100 gal	1200.00
2500 gal	1315.00
3000 gal	1515.00
4000 gal	1800.00
Duck	
1000 gal	650.00
1500 gal	810.00
2100 gal	920.00
2500 gal	990.00
3000 gal	1115.00
4000 gal	1365.00

SELECTED FIRE FIGHTER SALARY RANGES BY REGION OF COUNTRY AND POPULATION RANGE (1982)

Population Range	City	Entrance*	Maximum**
	Northeast		
Over 1,000,000	Philadelphia, PA	$18,333	$20,847
250,000-499,999	Buffalo, NY	14,686	18,693
100,000-249,000	Stanford, CT	18,822	20,848
	Worcester, MA	14,053	17,145
	Cambridge, MA	15,930	20,000
50,000-99,999	Cranston, RI	15,203	17,092
	East Orange, NJ	15,500	20,001
	Wilkes Barre, PA	16,650	17,700

Population Range	City	Entrance*	Maximum**
25,000-49,999	Andover, MA	14,643	17,290
	Ridgewood, NJ	16,980	24,000
	Torrington, CT	13,986	15,159
	White Plains, NY	15,510	22,075
10,000-24,999	Augusta, ME	11,976	14,264
	Brattleboro, VT	12,344	14,625
	Canandaigua, NY	13,163	16,786
	Duquesne, PA	17,200	18,116
	Central		
Over 1,000,000	Detroit, MI	19,906	26,296
500,000-1,000,000	Columbus, OH	12,522	21,882
	Indianapolis, IN	13,500	20,064
	Milwaukee, WI	17,466	22,533
250,000-499,999	Minneapolis, MN	18,538	26,884
	Toledo, OH	21,164	22,364
	Wichita, KS	15,592	19,466
100,000-249,999	Lincoln, NB	15,084	18,337
	Madison, WI	19,278	21,547
	South Bend, IN	13,850	13,850
	Springfield, MO	14,308	19,182
50,000-99,999	Euclid, OH	18,850	20,910
	Green Bay, WI	15,180	21,696
	Joliet, IL	17,699	22,585
	Overland Park, KS	16,411	23,085
	Sioux Falls, SD	16,302	19,172
25,000-49,999	Madison Hgts, MI	18,306	20,844
	Minot, ND	14,880	18,996
	St. Charles, MO	14,717	18,291
10,000-24,999	Boone, IA	14,820	17,700
	Mitchell, SD	12,420	13,588
	Noblesville, IN	10,015	12,558
	North Platte, NE	11,484	15,340
	Owatonna, MN	16,248	18,054
	Poplar Bluff, MO	10,320	11,676
	Wisconsin Rapids, WI	16,135	20,607
	South		
Over 1,000,000	Houston, TX	21,770	26,330
500,000-1,000,000	Dallas, TX	19,450	22,165
	Jacksonville, FL	14,244	19,416
	New Orleans, LA	13,188	18,576
250,000-499,999	Nashville/Davidson, TN	12,324	16,968
	Norfolk, VA	12,108	16,020
	Tampa, FL	14,128	16,716
100,000-249,999	Greensboro, NC	12,078	19,164
	Hampton, VA	11,838	16,112
	Hollywood, FL	16,748	21,503
	Little Rock, AR	12,535	16,786
	Lubbock, TX	14,414	19,781
	Mobile, AL	12,192	16,332
50,000-99,999	Albany, GA	11,124	16,278
	Clearwater, FL	13,824	17,654
	Galveston, TX	18,803	18,803
	Norman, OK	11,867	15,106

Population Range	City	Entrance*	Maximum**
	Odessa, TX	15,696	19,115
	Tuscaloosa, AL	14,418	15,498
25,000-49,999	Bartlesville, OK	12,929	15,608
	Danville, VA	12,480	17,555
	Lauderhill, FL	14,163	20,720
	Meridian, MS	10,899	14,310
	Muskogee, OK	10,739	13,488
	Rome, GA	11,525	16,220
	West Memphis, AR	12,390	15,576
10,000-24,999	Athens, TN	9,166	12,026
	Natchitoches, LA	9,782	10,953
	Newport, KY	10,501	11,501
	Salem, VA	10,676	15,779
	Thomasville, GA	9,782	12,497
	Tuskegee, AL	7,800	11,107
	Venice, FL	11,918	17,618
	West		
Over 1,000,000	Los Angeles, CA	22,279	28,480
500,000-1,000,000	Phoenix, AZ	16,424	21,639
	San Francisco, CA	23,322	26,988
	Denver, CO	16,392	24,000
250,000-499,999	Portland, OR	17,842	26,559
	Tucson, AZ	16,356	21,456
100,000-249,999	Glendale, CA	18,330	24,564
	Pueblo, CO	15,684	20,076
	Riverside, CA	17,874	23,376
50,000-99,999	Bellevue, WA	18,288	24,072
	Billings, MT	13,608	17,052
	Glendale, AZ	12,180	15,636
	Orem, UT	13,512	20,256
	Salem, OR	15,036	21,288
	Santa Barbara, CA	16,016	21,632
25,000-49,999	Cheyenne, WY	14,637	18,984
	Englewood, CO	16,848	22,212
	Missoula, MT	14,520	17,172
	Olympia, WA	20,376	25,212
	Pocatello, ID	16,822	18,798
	Roswell, NM	12,132	14,160
10,000-24,999	Alamogordo, NM	11,040	18,170
	Casa Grande, AZ	15,168	19,500
	Grants Pass, OR	14,001	17,931
	Juneau, AK	25,620	30,576
	Las Vegas, NM	10,596	11,640
	Puyallup, WA	20,658	25,525
	Rawlins, WY	15,780	19,992
	Ukiah, CA	16,866	20,004
	Yuba City, CA	14,130	14,130

***Annual base salary of a full-time fire fighter during the first 12 months on the force.**

****Maximum annual base salary paid a full-time employee not holding any promotional rank.**

NOTE: For all reporting cities the average annual entrance salary for full-time paid fire fighters is $15,013. The average maximum salary is $18,517, 23.3 percent higher than the average entrance salary. It takes an average of four years for fire fighters to reach the maximum salary.

Source: Gerard J. Hoetmer, "Table 3/10, Police, Fire, and Refuse Collection and Disposal Departments: Personnel, Salaries, and Expenditures for Cities over 10,000: 1982," in *The Municipal Year Book 1983*, (Washington, DC: International City Management Association, 1983), pp. 115-162.

Japanese Fire Service Today

The Japanese fire service, like the U.S. fire service, is made up of a corps of full-time (permanent) fire fighters and a much larger group of volunteer fire fighters. Permanent fire fighters numbered 122,204 in 1981; volunteer fire fighters numbered 1,063,624. In 1981, there were 914 fire service headquarters serving 369 cities, 110 towns and villages, and 435 communities jointly. Also in 1981, there were 1,462 fire stations and 2,930 branch fire stations in Japan.

The fire service system is organized in one of two ways: (1) a permanent system consisting of fire service headquarters and fire stations staffed by full-time fire fighters assisted by volunteers; or (2) a volunteer fire corps only.

In April 1981, 2,906 cities, towns, and villages had been identified as requiring a permanent fire service. Communities that do not have a permanent fire service, either because of too small a population or other difficulties in sustaining a full-time force, must rely on the "wide-area system." Under this system, which includes the concept of mutual aid, a smaller community may entrust its fire protection to a larger community better able to provide protection. As of April 1982, 24 cities, 81 towns, and 16 villages followed this type of system. Even more popular than the entrusting system is the joint fire service system. Using this system, towns or villages that have problems setting up fire service headquarters or stations themselves can jointly share permanent fire service protection. By April 1, 1982 there were 445 joint associations that served 2,302 communities (or 79.2 percent of all communities in Japan with a permanent fire service).

Those communities that do not have a permanent fire service rely on the volunteer fire corps, as do the larger municipalities in times of major disasters. The volunteer force, however, has been decreasing over the last ten years as a result of reorganization in response to the changing social structure, and the establishment of permanent fire service organizations.

Facilities and Equipment

The mechanization and scientific operation of fire service facilities and equipment, water supply systems, and fire alarm systems is an on-going process in Japan, supplemented by government subsidies.

In recent years, the fire service has been equipped with more pumpers, aerial ladders, chemical fire trucks, rescue trucks, water discharge trucks, helicopters, and fire boats. Increasing the quantities of such apparatus has been made necessary by the changes in the structure and construction of city buildings and the increase in the use and transport of dangerous materials.

Sources of water supply are classified as artificial (such as fire hydrants, fire cisterns, swimming pools) and natural (such as rivers, ponds, sea water). Hydrants account for 73.5 percent and cisterns 24.6 percent of the artificial water supply.

Fire Communication Equipment

Fire communication equipment used today in Japan consists of a dedicated emergency phone number (911), fire alarms, and fire service phones and radio phones. Fire alarms are sent from boxes directly to the nearest fire service organization. These boxes are set up either publicly along roads or privately by building owners. This type of alarm has been decreasing in recent years due to the increased use of the 911 phone number to report fires. Fire service phones and radio phones are used for emergency communications between fire service headquarters and fire stations, as well as on the fire ground itself. The use of such phones, as well as their quality, has been improving in recent years.

Full-time Fire Fighters Salary and Compensation

The average monthly salary for a fire fighter as of April 1, 1981 was Y176,148 for an average age of 33.4, compared with Y189,087 for general administrative officials with an average age of 36.6. Average allowances amounted to Y51,338 for fire personnel compared with Y39,681 for general administrative officials. (March, 1982: Y246.50 = US $1.00) The difference is explained by the dispatch and communications allowances given to fire personnel. Fire personnel are entitled to medical compensation, vacations, injury compensation, survivor's insurance, and funeral allowance. They also receive special public duty disaster compensation in the amount of less than fifty hundredth if engaged in fire fighting under highly dangerous conditions or while involved in disasters on duty. In 1981, there were 19.7 cases of such compensation per 1,000 persons.

Retirement is at age 60. Those beneath the rank of fire service commander or chief who retire after 20 year's continued service, or if they are forced off the staff, can start to receive their pension at age 55.

Working Hours

Fire service headquarters personnel are on daily or shift duty. Most communities use a two-shift system, although a three-shift system is also used by some.

Volunteer Fire Fighters Salary and Compensation

As special duty employees of the communities they serve, volunteer fire fighters are paid according to local ordinance. Thus the amount and payment method differ among communities. Accident compensation also depends on local ordinance, and consists of five types: for medical treatment, for forced rest due to medical treatment and lack of income, for injuries requiring long-term treatment, for physical disability due to deformity and disablement, for bereaved family, and for funeral. Volunteers are also entitled to special public duty disaster compensation in the same amount and for the same reasons as full-time fire personnel. Retirement remuneration is provided by the municipal fire fund for volunteers with at least five years of service. A mutual-aid fund system for public service accident compensation exists to assist part-time members of the volunteer fire corps who are involved in accidents on-duty. This fund covers expenses of municipal compensation, provides welfare facilities (for medical treatment), and pays a retirement allowance according to the mutual aid system.

Japan Firemen's Association

A national volunteer firemen's association was established in Japan in 1903 and reorganized in 1948 into the present association. The membership is made up of 47 prefectural firemen's associations in Japan. These associations consist of the municipal volunteer fire corps and some full-time fire fighters. The Association has headquarters in Tokyo.

The purpose of the Association is "to improve the welfare and fire service knowledge and skill of the members, reinforce fire service activities and fire department facilities as well as to disseminate fire service knowledge among the general public, thereby preventing damages done by disasters and contributing to the promotion of public safety."

Federation of World Volunteer Firefighters Associations

In 1980, the Japan Firemen's Association, under the leadership of its President, Ryoichi Sasakawa, began studying how to organize an international volunteer fire fighters association for the international exchange of information and brotherhood among fire fighters. Under the direction of the Japan Firemen's Association, a specific plan was outlined for the establishment of the Federation of World Volunteer Firefighters Association (FWVFA). An invitation to participate in the inaugural conference was sent to all the volunteer firemen's associations in Asia, Africa, North and South America, Europe, and the oceanic states. The conference was held December 1, 1982 at Sasakawa Hall in Japan Firemen's Hall. In all, 42 representatives from 17 countries took part in the conference and are today members of FWVFA.

Ryoichi Sasakawa

Directors of the Federation of World Volunteer Firefighters Associations

Chairman:	Ryoichi Sasakawa, President Japan Firemen's Association
Directors:	Representative of each member country
Secretary General:	Masaaki Tokuda, Managing Director Japan Firemen's Association

Member countries (Organization names):

Argentina	(Federaction Argentina de Bomberos Voluntarios)
Australia	(N.S.W. Volunteer Fire Brigades Demonstration Association)
Canada	(Canadian Association of Fire Chiefs Inc.)
Chile	(Junta Nacional de Cuerpos de Bomberos)
Egypt	(The Central Fire Services Dept. of Egypt)
Indonesia	(Jakarta Municipal Fire Department)
Italy	(Associazione Nazionale Vigili del Fuoco Voluntari Italiani)
Korea	(Fire Bureau, Home Ministry)
New Zealand	(United Fire Brigades' Association of N.Z.)
Paraguay	(Cuerpo de Bomberos Voluntarios del Paraguay)
The Philippines	(Association of Philippine Volunteer Fire Brigades Inc.)
Thailand	(Civil Defense Association of Thailand)
U.K.	(Retained Firefighters Union)
U.S.A.	(National Volunteer Fire Council)
Zambia	(Zambia Fire Services, Provincial and Local Government Administration Div., Lusaka)
Japan	(Japan Firemen's Association)

Secretariat:

Japan Firemen's Association
9-16, Toranomon 2-chome, Minato-ku, Tokyo, Japan
Telephone: Tokyo (03) 503-1481

Funds and Resources for the Fire Service

Like all government services, fire departments are discovering that competition for funding is becoming increasingly fierce. The fire chief is trapped between a cost-conscientious city or county government and a demanding public. High insurance rates and taxes, plus diminishing local resources, have made citizens more aware of the need for fire protection. At the same time, new hazards and dangers from chemicals transportation and natural incidents are causing citizens to demand more protection from these potential disasters.

Not every fire department will find the "pot of gold" it's looking for, but it can, through sufficient research and work, get assistance for improving its operation or for introducing additional services. Large federal grants and free-flowing financial aid are not as abundant as they used to be. In fact, they were never really plentiful. Only those who researched their needs and sources and matched the two were rewarded with grants, and then, only after months and sometimes years of work.

Assistance is often considered only as financial aid, but assistance can also mean people. Volunteers who will help you complete your task, formulate your plans, or even help you locate other sources of assistance, including money, are available.

Assistance can also mean technical advice. In some cases, the federal government provides community service leaders with technical assistance. This assistance can be by phone or on-site visits for a few hours up to several days. In other cases, the federal government provides communities with technical assistance through contracts with other local people when the expertise is not available on the federal level.

Assistance can also mean materials and publications that will allow you to accomplish what you need or learn more about other similar programs that can be implemented in your fire department.

Information on federal programs of interest to you may be obtained from a regionally located Federal Information Center. Information Center staff can help you locate the closest and/or most appropriate federal agency that handles the program areas of interest to you. These centers are operated by the U.S. General Services Administration.

You may contact a center by phone, personal visit, or letter. Each center is a focal point for information about the federal government. When you are seeking information, the center will either provide you with the answer or direct you to an agency representative who can help you. Many centers have toll-free telephone numbers or local phone numbers for long-distance locations.

A complete listing of all federal assistance programs and additional information can be found in the *Catalog of Federal Domestic Assistance* which is available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402 for $20.00 per copy. The catalog covers all federal assistance programs; however, it takes a knowledge of local conditions and some imagination to be able to select those programs that are appropriate to local conditions. For example, the availability of federal funds for fire protection of waterfront properties may depend upon the direction in which the proposal is written. There may be several programs that could be used depending on whether the need is for additional energy sources in the area, a reduction of unemployment, or an improvement of the environment, for example.

The *Catalog* is published annually, using the most current data available on the status of programs at the time the information is compiled. The basic edition of the *Catalog*, which is usually published in May, reflects completed congressional action on program legislation. A catalog update is published in December and reflects completed congressional action on the President's budget proposals and substantive legislation as of the date of compilation. The update must be retained and used along with the basic edition in order to obtain the most current information on program revisions.

The federal government is under mandate from the citizens, the Congress, and the

President to review all programs with a view toward reducing federal government expenditures. It is safe to assume that there will continue to be less federal funding available in the future and some of the programs listed in the *Catalog* will not be able to fund your requests. This is a situation you should consider as you apply for funds.

The National Fire Protection Association publication, *Funding and Sources for Fire Departments* is available from the NFPA to assist fire departments in locating sources of funding and in preparing proposals for assistance. It contains information on proposal writing and types of federal programs that may have funds available for fire services as well as sources of private funding assistance.

Innovative Trends in Delivering Public Fire Protection

Consolidation

Consolidation of fire departments, or regionalization, is a controversial subject in America. But since consolidation has many advantages, the pressure to merge fire departments is increasing. The major advantages are cost reduction and more efficient use of resources.

Some noteworthy examples of major consolidation of fire services in the United States are Los Angeles County, California; the metropolitan Dade County consolidation in Miami, Florida; the metropolitan regionalization of the suburbs around Atlanta, Georgia, Houston, Texas, and Nashville, Tennessee, and most recently, Orange County, Florida. There are also some noteworthy exceptions. For example, in the Boston area, there are over 30 metropolitan fire departments, each providing their town or city with services at somewhat duplicative costs. Consider the price that is being paid by these independent cities and towns. Under Proposition 2½, Boston has had to lay off one-third of its fire fighters. Fortunately, the Boston metropolitan area has functional consolidation in the form of an excellent mutual aid plan whereby the cities and towns send apparatus and equipment into each other's territories to assist in fire fighting. If it had not been for mutual aid, the Boston Fire Department with its reduced manpower would have been hard-pressed to handle several simultaneous multiple alarms that occurred in 1982.

Probably the most controversial consolidation discussions involve police and fire combinations. It is argued that a consolidated police and fire department, with cross-trained personnel, is a cost-effective, money-saving move for the municipality. Almost every experiment of this nature in the United States has failed for one reason or another. However, the consolidation of building inspection departments and fire marshal offices has generally been cost-effective and accepted. The most effective consolidations occur when the program aspects of the various departments have similar missions, such as safety code enforcement, inspection, construction plan approval, and occupancy certification.

The next level of consolidation, namely "functional consolidation," involves the consolidation of functions that are common to fire departments and other municipal departments or agencies, but does not involve the actual legal merger of the various departments. Functional consolidation is widely used to cut costs. Central purchasing, as practiced by the Washington, DC Metropolitan Council of Governments, is an example of cost-effective, functional consolidation. Another example is automatic mutual aid and the consolidation of dispatching and fire alarm offices in a region (such as Fairfax, Alexandria, and Arlington Counties in Virginia). Some of these consolidations involve initial start-up costs which must be provided through the enactment of legislation or bonding. Other areas that could be involved are administrative services, training, maintenance, fire prevention and investigations, and building code enforcement.

Some Unusual Legal Constraints

The multitude of jurisdictions and the diversity of state and local laws within the United States can create obstacles to cost-effective improvements in the delivery of public fire protection. For example, in New Jersey there is a law that prohibits budget expenditures from exceeding a 5-percent increase over the previous year's budget. This means a city can have a multi-million dollar surplus of revenues, but cannot increase its expenditures more than 5 percent of the previous year's budget. Another unique New Jersey State law prohibits independent fire districts and volunteer fire departments from setting up savings accounts in order to save for future projects. Because fire districts are not allowed to set aside money which can grow and earn interest for future expenditures, the districts have to borrow the money from a bank when they need the funds and then repay the bank.

Alternative Funding Sources

(Excerpts from "A Study of Alternative Funding Sources for the Fire Service" by the National Conference of Counties, 1980.)

Some of the alternative revenue sources for fire protection funding that are now being considered in the United States are summarized below:

1. **Fire Inspection and Permit Fees.** The issuance of a fire permit regulates businesses that use, store, or manufacture hazardous materials, use hazardous processes, or by their nature of business expose large groups of people to such hazards. The fee charged helps pay for the additional level of service provided by the fire department due to the need for inspections to regulate the hazard. The concept is that such activities should pay a proportionate share of the extra services required by the fire department over and above the basic service level provided to the rest of the community. As in many businesses, the fee charged should reflect not only the actual wages, but also the overhead costs. An example is the city of San Jose, California, which reportedly recoups a substantial percent of its entire fire prevention bureau budget through such fees.

2. **Subscription Services.** Because of the reduced budgets available to municipal governments, the practice of subscription services, popular in the 1700s, is being revived in many municipalities within the United States. The current trend started 20-25 years ago with ambulance or rescue services. Individual property owners or citizens would subscribe to the ambulance or rescue service on an annual subscription basis. The practice of subscription services has expanded to a few fire departments in the United States known as "private fire departments." The idea is the same; namely, that the citizen subscribes to the services of the fire department for a nominal fee and the fire department will respond to any fires or calls for emergency service from that particular property owner. As expected, those citizens who do not choose to subscribe to the fire department services are left without fire protection and there have been cases where private fire departments have allowed buildings and homes to burn to the ground because the property owner had failed to subscribe to the service.

3. **Insurance Franchise Fees.** The insurance franchise fee is based on the premise that a municipal corporation or municipality has the authority to legislate certain services for the public welfare. Since the protection of life and property is in the best interest of the public and a fire department finds itself providing protection for property that is insured, it is theorized that the insurance company's financial interests are being supported by the taxpaying municipal citizen. Further, the theory assumes that, because rubbish collection, taxi services, ambulance services, and now cable TV are regulated by the municipality, the selling of insurance with the excess profit accruing to the benefit of the municipality should likewise be controlled by the municipality. The insurance franchise is put out on bid. The insurance company that wins the bid then pays the city or the municipality a percentage of the premiums collected and these fees are used to help support the fire department.

4. Municipal Fire Insurance. An approach similar to the property insurance concept is for the fire insurance to be underwritten by the city or municipality in which the insured property owners are located. Under this concept, local government would write the policy, set the premium, and accumulate a surplus to cover any claims. Although discussed from time to time in the United States, there is no known municipality that has chosen this approach to increasing municipal revenues.

5. Fire Flow Charges. This method involves placing a fire protection charge on those occupancies that have a disproportionately high fire flow water demand such as warehouses, hazardous occupancies, etc. Because current fire protection engineering "state-of-the-art" allows for the estimation of required fire flow for various structures and occupancies, there is available a formula for charging a fee over and above the property taxation. Although this theory may be innovative and have a firm foundation in fire protection technology, it must be accepted by property owners and local political leaders in order to be legislated into ordinances or regulations that create the fee structure.

6. Private Enterprise Partnership. In this approach, a mutual partnership is developed between the city and a private corporation, usually to build an industrial park or a new development of some sort. The investors purchase the land and the city provides the site improvements, water supply, and so forth. In turn, the city receives a percentage share of the project profits. In addition to the profit-sharing concept, the developer may build a fire station on the project site and lease it back to the city for a nominal fee each year. Informal agreements occur wherein an industrial complex will provide its own fire suppression capability, including apparatus and manpower, and as a "good neighbor" extend support on a mutual aid basis to the surrounding community. There are numerous examples of this type of informal partnership between private industry and the local government for providing municipal fire protection.

7. Stand-by Fees. Some municipalities in the United States are charging for the fire department personnel and equipment required to stand-by at non-emergency or post-emergency incidents. Examples would be automobile accidents or trucking vehicular accidents that require long periods of stand-by while wreckers are removing the debris or the merchandise from the scene. Another example would be the fire watch at large public functions such as circuses or sporting events.

8. Fire Protection Contracts. A widespread practice in the west involves the extension of services beyond the municipality for a specified contract fee. In some cases, the fees are used to supplement existing levels of service, and in others they are used to hire additional personnel and equipment for the mutual benefit of the contracting parties.

9. Donations and Solicitations. This form of financing fire protection is very traditional in the United States in rural and suburban areas. In Delaware, for example, there are approximately 100 fire departments, and all but three are supported by solicitation and donation of funds.

10. Reimbursement for Extraordinary Expenses. In certain areas of the United States, there are ordinances and laws requiring the reimbursement of the fire department for the use of large quantities of foam or other expensive equipment to fight fires in industrial or hazardous occupancies. At least one municipality has gone a step further and designated a city employee as a "Risk Manager" whose responsibility is to respond to the scene of any incident where there is the possibility of violations. If the Risk Manager determines that this is the case, he will assess the liability of the party responsible and bill the owner for the cost of handling the incident.

11. Unnecessary Alarm Fees. There is increasing discussion within the American fire service that expenditures for unnecessary alarms or false alarms should be passed on to the property owner. Some cities have an ordinance that charges a fee anytime its fire department makes over three unnecessary alarms to any private fire alarm system.

12. Fire Brigade Training Fees. In some parts of the United States, fire departments are charging fees for training private fire brigades. In some areas, one municipality's training division will provide training for another municipality's recruit fire fighters on a fee basis.

13. Insurance Salvage Fee. This unusual concept probably has its origin in maritime salvage law. There is some support for the idea that the value of the property saved by the fire department should be a basis upon which the fire department can charge the insurance company a percentage fee for helping to save that property. The salvage fee itself could be a percentage amount and could be applied on a sliding scale according to the property value. The concept has the advantage of rewarding a fire department for its performance and shifting some of the burden of the cost of fire protection to the insurance company. If the fire department is inefficient, the insurance company pays a larger loss.

14. Fines. These are levied as a result of a violation of a fire-related standard or code.

15. Public Service Call Fees. These would be fees for services performed that are nonemergency in nature such as lockouts, pumping of cellars, animal rescue, and aerial ladder service calls.

What Is the Price Tag for a Human Life?

by Tom Tugend, UCLA Public Information Office

(Reprinted with permission from *The Engineer of California*, May 1982)

How much is a human being worth and what is society's price tag to save a single life?

Put another way, what risks and costs are we willing to assume for the benefits of electricity, plane travel, chest X-rays, clean air or earthquake-resistant homes?

The answers go at once to the basic values of a people and to the most routine actions of every citizen.

When a man buys a retread instead of a new safety tire or puts off a medical checkup to save on doctor bills, he is weighing risks and costs against safety and benefits. So is the government when it spends $200,000 to reduce the national traffic toll by one fatality, but $5 million to save the same statistical life from a nuclear reactor accident.

At UCLA, a team of experts in engineering, psychology, economics, sociology, political science and decision analysis has been working for ten years to develop rational guidelines for what have been mainly intuitive, emotional or political decisions. In some 40 reports for the National Science Foundation and the old Atomic Energy Commission, the group has been trying to qualify the risks of dam failures, meteorite impacts, and earthquakes and the cost benefits of water quality, use of chemicals and airplane transport.

Current studies explore methods for more effective prevention by local and state agencies of hazardous situations, such as the chemical pollution found at Love Canal.

The leader of the group is Prof. David Okrent of the UCLA School of Engineering and Applied Science, a national authority on nuclear reactor safety who has broadened his research into the overall field of risk management.

Granting the ethical and moral complexities of putting dollar signs on a specific human life, the UCLA studies deal rather with the broad statistical odds and risks facing large numbers of people.

For instance, notes Dr. Okrent, nobody asks the price for rescuing one particular girl trapped in a deep well shaft. For the risk manager, however, the question is how many such accidents occur a year and how much money the voters might allot to put protective covers on all wells.

Amidst the detailed facts and figures, some broad observations can be drawn from the

UCLA reports:

- Life will never be free of hazards and no country is rich enough to eliminate all risks. If too much of the national wealth goes for risk elimination, less may be available for general productivity and ultimately for full employment, housing and health care. Since a people's average life expectancy generally goes up with the standard of living, a balance has to be struck between the cost of safety measures and the benefits of a strong economy.
- The price society is willing to pay to save one life or, as Dr. Okrent puts it, "defer a premature death," varies enormously. Life's dollar value depends on where the hypothetical victim lives, what kind of work he does, the impact of pressure groups and changing social priorities.

  According to figures compiled in 1975, the cost of averting a single fatality through a general cervical cancer screening program for women was $25,000; through improved median road barriers, $230,000; through upgraded coal mine safety, $22 million; and through safer radioactive waste disposal, $100 million.

A similar British study showed that England spent $10,000 on accident prevention to save the life of an agricultural worker, but $20 million for a high-rise apartment dweller.

For the altruistically-minded, the best global bargains in life saving are to spend $100 for immunization in Indonesia or send $5,000 in relief aid to a famine-stricken country.

- If our priorities and payoffs in allocating life-saving money are as askew as the figures indicate, "we are, statistically speaking, killing people whose premature deaths could be prevented by a better allocation of resources," says Dr. Okrent.

  "Pressure groups which concentrate solely on the complete elimination of one particular risk, without looking at the total picture, must bear a responsibility for such misallocations," he adds.
- Most people are largely ignorant of risk ratios, such as the relative safety of plane travel over car driving. On the other hand, society in effect condones some known risks, such as drunk driving, which accounts for half the nation's traffic fatalities.
- Some risks must be accepted to meet essential needs. Enough drinking water has to be supplied, even at the price of an occasional dam failure. Society may be unwilling to accept the same risk for merely beneficial purposes, such as sprinklering lawns, and even less for peripheral needs, for instance, to operate decorative water fountains.

Systematic research into risk management is barely a decade old, says Dr. Okrent, and the interplay of social, political, economic, technological and ethical factors demands much more widespread and intensive study. He advocates deeper involvement by state agencies, backed by a central risk management information supported by the federal government.

Code Enforcement Programs

About This Study

The information included in "Code Enforcement Programs" is condensed from the *Code Administration Resource Directory* that was prepared by the International Association of Fire Chiefs under a grant from FEMA/USFA. The purpose of the report is to explain and identify key resources to help fire chiefs and government officials plan and implement code enforcement programs. The programs in the communities represented can be used as general benchmarks for code enforcement performance and are valuable for comparing levels of effort and techniques. Many aspects of these enforcement strategies are transferable to a variety of circumstances. The criteria for selecting the programs were population and area size, type of department, type of code enforcement agency, and nature of enforcement activities.

The following chart lists communities with successful and innovative code enforcement programs in the U.S. Key aspects of each program are listed on the vertical axis and communities by population size are listed on the horizontal axis.

Key Aspects

1. *Type of Department*: Whether career, volunteer, or combination. Usually refers to operational unit.
2. *Type of Model Code*: Most of the communities have adopted one of the following model codes:
   ICBO, International Conference of Building Officials
   BOCA, Building Officials and Code Administrators
   SBCC, Southern Building Code Congress
   NFPA, National Fire Protection Association
   AIA, American Insurance Association
   Other, Any code adopted from other than the above organizations
   F, Adoption of the organization's fire prevention code
   B, Adoption of the building code
3. *Code Enforcement Responsibility*: Specifies which agency enforces firesafety code. Listed as one of the following: a fire service organization including a fire department or a fire marshal's office; a consolidation of the local fire department with another local agency (i.e., building, police, or housing department or a regional consolidation of fire departments from contiguous districts); or an organization other than the fire department, such as a building department or a centralized code enforcement bureau.
4. *Code Enforcement Activities*: Mechanisms used to enforce firesafety codes in new construction and existing structures, as follows:
   - Plan Review: Routine review of all appropriate design plans for compliance with fire prevention code and life safety.
   - Sign-off on Building Permit: Official required to sign the building permit prior to issuance.
   - Sign-off on Occupancy Permit: Firesafety officials required to sign the occupancy permit prior to issuance.
   - Construction Site Inspections: Systematic, on-site inspections during construction to ensure fire code compliance.
   - Company Maintenance Inspections: Suppression personnel involvement in routine maintenance code inspections in existing buildings.
   - Fire Prevention Bureau/Uniformed: Uniformed personnel devoted solely to administering the code enforcement program, to performing specialized inspections and to securing the compliance of consistent code violators.
   - Fire Prevention Bureau/Civilian: Use of civilian personnel or personnel hired from department to perform any of the professional tasks specified in the preceding category.
   - Cross-Training: This indicates multiple use of fire fighters across traditional departmental lines. For instance, a fire fighter might also be involved in housing and building code inspections or law enforcement maintenance.
   - Rental Housing Inspection: Whether the fire department is involved in conducting fire prevention inspections in rental housing properties.
5. *Compliance Authority*: The techniques to hasten the compliance process are:
   - Company Re-Inspections: Suppression personnel are responsible for conducting follow-up inspections to check for corrections of maintenance code violations.
   - Ticket Fine: Certain inspection personnel are authorized to issue a ticket which carries a fine for code violations. The procedure is similar to the issuance of traffic tickets by police officers. The tickets can be for minor violations and the bail schedule varies according to type of violation.
   - Citation: Summons to appear in court. Some inspection personnel have certain police powers and are authorized to issue citations that require code violators to appear in court. The citation may also set a fine based on the type of violation, though only a judge can impose it.

6. *Data Information Systems*: The retrieval of building and fire incident data to assist in program planning and evaluation and the organization of inspections of existing structures.
    - Data Collection: Denotes whether the code enforcement agency collects data and contributes to either a state and/or national information system, such as, the Uniform Fire Incident Reporting System (UFIRS) or the National Fire Incident Reporting System (NFIRS).
    - Scheduling of Inspections: An "A" indicates whether a department uses an automated system to schedule and track inspections. An "M" indicates a manual system.

Additional Information

Information on the technical, administrative, political, and legal implications of code enforcement is available from the municipalities and other districts identified on the chart. Addresses are listed below and following the chart, with the population of each community in parentheses following the department name.

Alexandria Fire Department (150,000)
900 N. 2nd St.
Alexandria, VA 22314
(703) 750-6522

Ames Fire Department (47,000)
140 Burnett
Ames, IA 50010
(515) 232-9932

Arcade Fire District (60,000)
3000 Fulton Ave.
Sacramento, CA 95821
(916) 485-1864

Arden Fire District (60,000)
220 Park Town Circle
Sacramento, CA 95825
(916) 482-6873

Carmichael Fire District (75,000)
5634 Robertson Ave.
Carmichael, CA 95608
(916) 485-2289

Arvada Fire Protection District (148,000)
P. O. Box 3-D
Arvada, CO 80001
(303) 424-3012

Aurora Fire Department (160,000)
1470 S. Havana, Suite 424
Aurora, CO 80012
(303) 695-7116

Division of Fire Prevention (90,000)
2215 W. Old Shakopee Rd.
Bloomington, MN 55431
(612) 887-9633

Centre Region Council of Governments (72,000)
Code Enforcement
188 S. Fraser St.
State College, PA 16801
(814) 234-7195

Charlotte Fire Department (310,000)
Fire Prevention Bureau
125 S. Davidson St.
Charlotte, NC 28202
(704) 374-2101

Chicago Fire Department (3,400,000)
Bureau of Fire Prevention
121 N. La Salle St.
Chicago, IL 60602
(312) 744-4762

Cincinnati Division of Fire (413,000)
430 Central Ave.
Cincinnati, OH 45202
(503) 352-3296

Dallas Fire Department (900,000)
Fire Prevention Inspection and Education Division
201 Main St.
Dallas, TX 75201
(214) 670-4308

Department of Fire (200,000)
300 N. Main
Dayton, OH 45402
(513) 225-5344

Dover Township Fire Prevention Bureau (67,000)
55 Hyers St.
Toms River, NJ 08753
(201) 240-5153

Group A Population: 500,000–3,500,000		Chicago, IL	Cincinnati, OH	Dallas, TX	Los Angeles, CA	Memphis, TN	Milwaukee, WI	Montgomery County, MD	Nassau County, NY	Phoenix, AZ	Prince Georges County, MD	San Jose, CA	Seattle, WA
Type of Department	Fully Paid	X	X	X	X	X	X			X		X	X
	Paid/Volunteer							X			X		
	Fully Volunteer								X				
Type of Model Code	ICBO			BF						B		BF	BF
	BOCA		BF			F		B			B		
	SBCC												
	NFPA							F			F		
	AIA								F				
	Other	BF			FB	B	BF			F			
Responsible for Code Enforcement	Fire Department	X	X	X	X	X		X	X	X	X	X	X
	Consolidation (e.g., F/B)												
	Other						X						
Code Enforcement Activities	Plan Review	X	X	X	X	X		X		X	X	X	X
	Sign-off Building Permit	X	X		X			X			X	X	X
	Sign-off Occupancy Permit	X		X	X	X		X			X	X	X
	Construction Site Inspection	X	X	X	X	X		X		X	X	X	X
	Company Maintenance Inspections	X	X	X	X			X		X	X	X	X
	FPB/Uniform Inspectors	X	X	X	X	X		X	X	X	X	X	X
	FPB/Civilian Inspectors				X					X			
	Cross-Training												
	Rental Housing Inspection	X	X								X		
Compliance Authority	Company Re-Inspection	X	X	X	X			X		X	X		X
	Ticket/Fine												
	Citation; Court Appearance	X	X	X	X	X		X	X	X	X	X	X
Data Information Systems	Data Collection	X	X	X	X	X		X		X	X	X	X
	Scheduling of Inspectors (e.g., Manual/Automated)	A	M	M	M	M		M	M	M	M	A	M

Group B
Population: 120,000–500,000

		Alexandria, VA	Arvada, CO	Aurora, CO	Charlotte, NC	Dayton, OH	Guilford County, NC	Miami, FL	Oklahoma City, OK	Scottsdale, AZ	St. Paul, MN	Wichita, KS	Orlando, FL
Type of Department	Fully Paid	X		X	X	X		X	X		X	X	X
	Paid/Volunteer		X							X			
	Fully Volunteer						X						
Type of Model Code	ICBO		BF	BF						BF	BF	BF	
	BOCA	BF				BF			BF				
	SBCC												BF
	NFPA						F						
	AIA						B						
	Other				BF			BF					
Responsible for Code Enforcement	Fire Department	X	X	X	X	X	X		X	X	X	X	X
	Consolidation (e.g., F/B)							X					
	Other												
Code Enforcement Activities	Plan Review	X	X	X	X	X	X	X	X	X	X	X	X
	Sign-off Building Permit		X	X	X		X	X	X	X	X	X	
	Sign-off Occupancy Permit		X	X	X	X	X	X	X	X	X	X	X
	Construction Site Inspection	X	X	X	X			X	X	X	X		X
	Company Maintenance Inspections	X	X	X	X	X	X	X	X	X	X	X	X
	FPB/Uniform Inspectors	X	X	X	X	X	X	X	X	X	X	X	X
	FPB/Civilian Inspectors			X	X	X		X			X		X
	Cross-Training												
	Rental Housing Inspection								X				X
Compliance Authority	Company Re-Inspection	X		X	X	X	X		X		X	X	X
	Ticket/Fine					X			X		X		
	Citation; Court Appearance	X		X	X	X	X	X	X		X	X	
Data Information Systems	Data Collection	X		X	X	X	X	X	X	X	X	X	X
	Scheduling of Inspectors (e.g., Manual/Automated)	M	M	M	A	A	M	M	A	M	M	A	M

	Group C Population: 45,000–120,000	Ames, IA	Arcade, CA	Bloomington, MN	Centre Region, PA	Dover Township, NJ	Edina, MN	Farmington Hills, MI	Mountain View, CA	Mount Prospect, IL	Rancho Cordova, CA	Rock Island, IL
Type of Department	Fully Paid	X	X						X	X		X
	Paid/Volunteer						X	X			X	
	Fully Volunteer			X	X	X						
Type of Model Code	ICBO	BF	BF	B			BF		BF		BF	B
	BOCA				BF	BF		BF		BF		
	SBCC											
	NFPA			F								F
	AIA											
	Other				X							
Responsible for Code Enforcement	Fire Department	X				X		X	X	X		X
	Consolidation (e.g., F/B)		X				X				X	
	Other			X								
Code Enforcement Activities	Plan Review	X	X	X		X	X	X	X	X	X	X
	Sign-off Building Permit		X	X		X	X			X		X
	Sign-off Occupancy Permit	X	X	X		X	X		X	X		
	Construction Site Inspection	X	X	X		X	X	X	X	X		X
	Company Maintenance Inspections	X	X				X		X		X	X
	FPB/Uniform Inspectors	X		X		X	X	X	X	X	X	X
	FPB/Civilian Inspectors									X		
	Cross-Training						X			X		
	Rental Housing Inspection	X				X						
Compliance Authority	Company Re-Inspection		X				X		X		X	X
	Ticket/Fine			X							X	
	Citation; Court Appearance		X	X		X	X				X	X
Data Information Systems	Data Collection	X	X	X		X	X	X	X		X	X
	Scheduling of Inspectors (e.g., Manual/Automated)	A	M	M		A	M	M	M	M	M	M

Group D Population: 5,000–45,000		Fairborn, OH	Fenton, MI	Kirkland, WA	Oak Brook, IL	Oak Park, MI	Palm Springs, CA	Rialto, CA	San Clemente, CA	Tracey, CA	Willows, CA
Type of Department	Fully Paid				X		X				
	Paid/Volunteer	X	X	X		X		X	X	X	X
	Fully Volunteer										
Type of Model Code	ICBO			BF			BF	BF	BF	BF	BF
	BOCA	BF	BF			BF					
	SBCC										
	NFPA										
	AIA				F						
	Other				B						
Responsible for Code Enforcement	Fire Department	X	X				X		X		
	Consolidation (e.g., F/B)			X	X	X		X		X	X
	Other										
Code Enforcement Activities	Plan Review	X	X	X	X	X	X	X	X	X	X
	Sign-off Building Permit	X	X	X	X	X		X	X	X	X
	Sign-off Occupancy Permit		X	X	X	X		X	X	X	X
	Construction Site Inspection		X	X	X	X	X	X	X	X	X
	Company Maintenance Inspections	X		X		X	X	X	X	X	X
	FPB/Uniform Inspectors	X	X	X	X	X	X	X	X	X	X
	FPB/Civilian Inspectors		X	X				X		X	
	Cross-Training	X			X	X		X		X	X
	Rental Housing Inspection		X					X			
Compliance Authority	Company Re-Inspection	X	X	X			X	X	X	X	X
	Ticket/Fine						X				
	Citation; Court Appearance	X	X				X	X	X	X	X
Data Information Systems	Data Collection	X	X	X		X	X	X	X	X	X
	Scheduling of Inspectors (e.g., Manual/Automated)	M	M	M	M	M	M	M	M	M	M

Edina Fire Department (49,000)
6250 Tracy Ave.
Edina, MN 55436

Fairborn Fire Department (36,000)
70 W. Hebble Ave.
Fairborn, OH 45324
(513) 879-1730

Farmington Hills Fire Department (60,000)
28711 Drake Rd.
Farmington Hills, MI 40808
(313) 553-0740

Fenton Fire Department (9,000)
301 S. Leroy St.
Fenton, MI 48430
(313) 629-5349

Department of Emergency Services
(350,000)
Guilford County Fire Marshal
P. O. Box 11356
Greensboro, NC 27409
(919) 299-1351

Kirkland Department of Fire Services
(12,000 - Kirkland)
(33,000 - King County Fire District #41)
210 Main St.
Kirkland, WA 98033
(206) 827-4606

Los Angeles Fire Department (3,000,000)
Fire Prevention Bureau
Engineering and Research Section
200 Main St.
Los Angeles, CA 90012
(213) 485-5980

Memphis Fire Department (700,000)
Memphis, TN
(901) 458-8281

City of Miami Fire Department (380,000)
P. O. Box 330708
Miami, FL 33133
(305) 350-7800

Milwaukee Fire Department (670,000)
6680 N. Teutonia Ave.
Milwaukee, WI 53209
(414) 347-2323

Department of Building Inspection
(141) 278-2548

Division of Fire Prevention (550,000)
Department of Fire/Rescue Services
Montgomery County Government
6110 Executive Blvd.
Rockville, MD 20851
(301) 468-4153

Mount Prospect Fire Department (55,000)
112 E. Northwest Highway
Mount Prospect, IL 60056
(312) 392-6000, Ext. 165

Mountain View Fire Department (60,000)
997 Villa St.
Mountain View, CA 84041
(415) 966-6365

Nassau County Fire Marshal (1,000,000)
899 Jerusalem
Uniondale, NY 11553
(516) 292-4850

Office of the City Manager (6,000 Residential)
(30,000 Commercial)
Department of Fire
Oak Brook, IL 60521
(312) 654-2220

Oak Park Public Safety (36,700)
Fire Division
13600 Oak Park Blvd.
Oak Park, MI 48237
(313) 547-1337, Ext. 283

Oklahoma City Fire Department (390,000)
820 Northwest 5
Oklahoma City, OK 73106
(405) 235-3314

Orlando Fire Department (124,000)
P.O. Box 2846
Orlando, FL 32802
(305) 849-2386

Palm Springs Fire Department (35,000)
(90,000 during tourist season)
3000 N. El Cielo Rd.
Palm Springs, CA 92262

Phoenix Fire Department (850,000)
620 W. Washington
Phoenix, AZ 85003
(602) 262-6297

Prince Georges County Fire Department
(670,000)
4318 Rhode Island Ave.
Brentwood, MD 20722
(301) 699-2942

Rancho Cordova Dire District (114,000)
10595 Fulsom Blvd.
Rancho Cordova, CA 95670
(916) 363-9463

Rialto Fire Department (31,000)
131 S. Willow Ave.
Rialto, CA 92376
(714) 375-3410

Rock Island Fire Department (47,000)
1313 - 5th Ave.
Rock Island, IL 61201
(309) 793-3475

San Clemente Fire Department (30,000)
100 Avenida Presidio
San Clemente, CA 92672
(714) 492-5101

San Jose Fire Department (672,000)
476 Park Ave.
San Jose, CA
277-4656

St. Paul Fire Department (280,000)
101 E. 10th St.
St. Paul, MN 55101
(612) 224-7811)

Rural Metro Fire Department (100,000)
P. O. Box F
Scottsdale, AR 85252
(602) 994-3886

Seattle Fire Department (550,000)
301 2nd Ave., NW
Seattle, WA 98104
(206) 625-4077

Tracy Fire Department (17,000)
Tracy, CA 95376
(209) 835-2525

Wichita Fire Department (280,000)
455 N. Main
Wichita, KS 67202
(316) 268-4451

Willows Fire Department (5,000)
445 S. Butte
Willows, CA 95988
(916) 934-3323

Code Administration Resource Directory Project Team Members

IAFC Executive Committee

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President
Tulsa, OK

Chief Charles Kamprad
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St. Louis, MO

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Innovative Techniques in Building Code Enforcement

Cities throughout the country have been experimenting with a variety of new techniques to increase the effectiveness of building code enforcement. This technology has recently been disseminated and transferred to other communities. Listed here are references for information about experiments that have been successful in expanding the depth, coverage, and reliability of inspections and/or that have expedited compliance of code violations.

Administrative Improvements

Computerized Scheduling of Inspections

Ames Fire Department
1300 Burnet
Ames, IA 50010
(515) 232-9932

Charlotte Fire Department
125 S. Davidson
Charlotte, NC 28202
(704) 374-2102

Chicago Fire Department
Bureau of Fire Prevention
121 N. LaSalle
Chicago, IL 60602
(312) 744-4759

Dayton Fire Department
300 N. Main
Dayton, OH 45402
(513) 225-5344

Dover Township Fire Department
55 Hyers St.
Toms River, NJ 08753
(201) 240-5153

Oklahoma City Fire Department
820 Northwest 5
Oklahoma City, OK 73106
(405) 235-3314

San Jose Fire Department
476 Park Ave.
San Jose, CA 95110
(408) 277-4656

Santa Ana Fire Department
120 W. Wright St.
Santa Ana, CA 92701
(714) 834-4125

Wichita Fire Department
455 N. Main
Wichita, KS 67202
(316) 268-4451

FIRS

The National Fire Protection Association offers a software package for computerized scheduling of inspections that is designed for the collection, storage, and processing of inspection data and the scheduling of inspections. The Fire Inspection Reporting System (FIRS) package includes eight volumes of documentation, computer programs, test data, and six days of on-site technical assistance in implementation of the system. For further information contact:

Manager, Fire Service Management Systems
National Fire Protection Association
Batterymarch Park
Quincy, MA 02269
(617) 328-9290

UFIRS

A software package for the collection and analysis of fire incident data has also been developed. The Uniform Fire Incident Reporting System (UFIRS) is currently assisting communities in documenting, storing, and analyzing fire incident data. Communities that are currently using UFIRS are listed as follows:

UFIRS Communities

Arizona
Tucson Fire Department
P.O. Box 27210
Tucson

California
Anaheim Fire Department
500 E. Broadway
Anaheim

Berkeley Fire Department
2105 Grove St.
Berkeley

Fresno Fire Department
450 M St.
Fresno

Mountain View Fire Department
997 Villa St.
Mountain View

Oakland Fire Department
1330 Grove St.
Oakland

Palo Alto Fire Department
250 Hamilton Ave.
Palo Alto

Sacramento Fire Department
915 Eye St., Room 3
Sacramento

San Jose Fire Department
476 Park Ave.
San Jose

Santa Barbara County Fire Department
4410 Cathedral Oaks Rd.
Santa Barbara

Torrance Fire Department
1701 Crenshaw Blvd.
Torrance

Colorado
Denver Fire Department
745 W. Colfax Ave.
Denver

Florida
Jacksonville Fire Division
1350 E. Adams St.
Jacksonville

Illinois
Rockford Fire Department
204 S. First St.
Rockford

Kansas
Wichita Fire Department
455 N. Main
12th Floor
Wichita

Louisiana
Fire Department Headquarters
317 Decatur St.
New Orleans

Maryland
Anne Arundel County Fire Department
P.O. Box 276
Millersville

Baltimore County Fire Department
800 York Rd.
Towson

Michigan
Lansing Fire Department
120 E. Shiawassee
Lansing

Missouri
Columbia Fire Department
P.O. Box N
Columbia

Kansas City Fire Department
22nd Floor, City Hall
414 E. 12th St.
Kansas City

Nebraska
Lincoln Fire Department
1801 Q St.
Lincoln

New Jersey
Elizabeth Fire Department
316 Irving Ave.
Elizabeth

New Mexico
Albuquerque Fire Department
P.O. Box 258
Albuquerque

New York
Syracuse Department of Fire
Room 602
Public Safety Building
511 S. State St.
Syracuse

North Carolina
Greensboro Fire Department
318 N. Greene St.
Greensboro

Oklahoma
Tulsa Fire Department
411 S. Frankfort St.
Tulsa

Pennsylvania
Pittsburgh Fire Department
Sixth Floor, Public Safety Bldg.
Pittsburgh

Texas
Dallas Fire Department
2111 Main St.
Dallas

Fort Worth Fire Department
1000 Throckmorton St.
Fort Worth

Houston Fire Department
410 Bagby
Houston

San Antonio Fire Department
P.O. Box 9066
San Antonio

Virginia
Chesterfield County Fire Department
P.O. Box 40
Chesterfield

Portsmouth Fire Department
361 Effingham St.
Portsmouth

Washington
Bellevue Fire Department
P.O. Box 1768
Bellevue

Everett Fire Department
2801 Oakes
Everett

Wisconsin
Madison Fire Department
City of Madison
Madison

Canada
Kitchener Fire Department
150 Highland Rd., W
Kitchener, Ont.

Saskatoon Fire Department
125 Idylwyld Dr., S
Saskatoon, SK

NFIRS

Below are listed states which are currently using the data collection system that is maintained by the Federal Emergency Management Agency, commonly known as NFIRS.

Alaska
Arizona
Arkansas
California
Colorado
Connecticut
Delaware
District of Columbia
Florida
Georgia
Hawaii
Idaho
Illinois
Iowa
Kansas
Louisiana
Maine
Maryland
Massachusetts
Michigan
Minnesota
Montana
Nevada
New Hampshire
New Jersey
*New Mexico
New York
North Carolina
Ohio
Oregon
Rhode Island
South Carolina
South Dakota
Tennessee
Texas
Vermont
Virginia
Washington
West Virginia
Wisconsin
Wyoming

*Coming on line

Judicial Procedures

Administrative Hearing Boards

Code Compliance Board:
Chicago Fire Department
Bureau of Fire Prevention
121 N. LaSalle St.
Chicago, IL 60602
(312) 744-4762

Code Enforcement Board:
Law Department
City of Orlando
Orlando, FL 32802

Local Board of Inspections and Appeals:
Department of Fire
300 N. Main
Dayton, OH 45402
(513) 225-5344

Palm Beach County Code Enforcement Board:
Planning, Zoning and Building Department
810 Datura St.
West Palm Beach, FL 33402
(305) 837-3390

Special Courts for Code Compliance

City of Boston Division
1003 New Courthouse
Pemberton Square
Boston, MA 02108
(617) 725-8484

Buffalo Housing Court
Suite 350
50 Delaware Ave.
Buffalo, NY 14202
(716) 847-8200

Housing Court
Fire Municipal District
1111 Daley Center
Chicago, IL 60602
(312) 443-4528

Hampden County Division
50 State St.
Springfield, MA 01103
(413) 781-8100

Housing Session
Superior Court
Hartford/New Britain Judicial District
83½ Lafayette St.
Hartford, CT 06106
(203) 566-8550

Enforcement Court
Municipal Court of Marion County
1442 City-County Bldg.
Indianapolis, IN 64204
(317) 633-8224

Pittsburgh Magistrates Court
First and Grant Sts.
Pittsburgh, PA 15219
(412) 255-2605

Pre-Settlement Hearing
Seattle Municipal Court
610 Third Ave., Room 100
Seattle, WA 98104
(206) 625-4741

State Smoke Detector Requirements

Over 50 percent of American homes are protected by smoke detectors according to a telephone survey of smoke detector requirements conducted in 1981 and published in 1982 by the Model Interstate Scientific and Technical Information Clearinghouse of the National Conference of State Legislatures. Partial funding for the survey, which also surveyed smoke detector legislation introduced in the 1981 legislative session, was received from the United States Fire Administration. The survey found that 25 states require smoke detectors in all classes of new residential construction: Alabama, Alaska, California, Colorado, Connecticut, Hawaii, Indiana, Maine, Maryland, Massachusetts, Minnesota, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, North Carolina, Oregon, Rhode Island, South Carolina, Virginia, Washington, Wisconsin, and Wyoming.

Eighteen states require one or more classes of existing residential housing to be retrofitted. Most states prescribe conditions that trigger a retrofit requirement: Alabama, Alaska (at the time of sale), Hawaii (when remodeling costs exceed $1,000), Kentucky (apartment buildings), Maryland, Massachusetts (at the time of sale), Minnesota, Nebraska (when an owner-occupied single-family house is remodeled; immediately for all rentals), Nevada (excludes single-family houses), New Jersey (excludes single-family houses), New Mexico (when costs of remodeling exceed $1,000), North Dakota (apartment buildings), Ohio (excludes single family houses), Oregon (single-family houses when remodeling costs exceed $1,000; all others must retrofit now), South Carolina, Texas (all rentals), Washington (excludes owner-occupied single-family houses), and Wyoming (when costs of remodeling exceed $1,000 or when one or more sleeping rooms are added).

Two states require special detectors for the deaf and hearing impaired: North Dakota and Maryland.

Although it is commendable that over 50 percent of American homes are protected by smoke detectors, the report noted that smoke detector owners tend to be white, with some college education and fairly high incomes, and tend to live in higher priced housing than those not owning smoke detectors. The poor, the elderly, and minorities tend not to perceive a danger to their lives and property from fire. Thus they are less likely to purchase their own smoke detectors. In addition, the handicapped have not been reached by most state smoke detector requirements. In conclusion, the report stated that additional requirements for smoke detectors should extend fire protection to almost every American, with specific requirements for detectors for the deaf and hearing impaired and for existing housing — especially that occupied by the poor and the elderly.

The results of the survey for each state are included below. The results have been updated for most states through an NFPA survey conducted in mid-1983.

Alabama

Current Status

Smoke detectors are required in all new and existing residential buildings. This requirement is applicable to single-family dwellings as well as multi-unit dwellings. During the 1981 legislative session, a law was passed to require a smoke detector in each hotel guest sleeping room. This law is applicable to new and existing buildings. Smoke detectors are also required in all hospitals which are not already equipped with automatic sprinkler systems, all correctional institutions, and all child day-care centers. Battery-operated smoke detectors are permitted in existing structures, but smoke detectors in new structures must be wired into the main power source.

Codes

Alabama has adopted the 1979 edition of the Standard Building Code (SBC) and the Standard Fire Code, which are mandatory throughout the state. For institutional buildings, the 1981 edition of NFPA *101* is enforced. Local ordinances are permitted but must not be in conflict with state ordinances. Amendments for 1980 and 1981 to the SBC have been adopted.

1981 Bill Introductions

Two bills were introduced in the 1981 legislative session. S.29 and H.40 would require hotel owners to install and maintain smoke detectors in each hotel guest sleeping room. S.29 would also include provisions for maintenance of detectors and established penalities for tampering with or removing a smoke detector from a room. S.20 passed into law as Act 290. H.40 died.

Contact

Roy Thornell
State Fire Marshal
445 S. McDonaugh St.
Montgomery, AL 36104

Alaska

Current Status

Alaska requires smoke detection devices in all living units built, manufactured, or sold in the state. This law is interpreted to include all existing buildings. Smoke detection devices must comply with NFPA 74. In addition to single-station smoke detectors for each dwelling unit, supervised smoke detection systems are required in hospitals, nursing homes, homes for children, jails, prisons, apartment buildings, and hotels.

Codes

For fire prevention, Alaska has adopted, with amendments, the 1979 editions of the Uniform Building Code, the Uniform Fire Code, and the Uniform Mechanical Code.

The state fire marshal's office is part of the Department of Public Safety. The department has adopted rules and regulations relating to fire detection and suppression equipment as well as safety criteria for commercial, industrial, business, institutional and other public buildings, and buildings used for residential purposes (4 or more dwelling units).

1981 Bill Introductions

None. However, a study on the use of smoke detectors in rural Alaskan residences was prepared for the Alaska Council on Science and Technology which is administering a research program on this subject.

Contact

State Fire Marshal
Department of Public Safety
Pouch 6313
Anchorage, AK 99502

Arizona

Current Status

Arizona has no smoke detector legislation applicable to residential housing. Schools and health care institutions are required to have smoke detection systems. Legislation to require smoke detectors was passed in the Senate during the 1981 session, but failed in the House.

Codes

The Arizona state fire marshal's office enforces a minimum standard state code based on the 1979 edition of the Uniform Fire Code. The 1981 edition of the NFPA 101 has also been adopted. Fire codes applicable to residential buildings are left to the jurisdiction.

1982 Bill Introductions

SB.1370, which was approved by the Governor in April 1983, requires that an approved smoke detector be installed during construction in each new residential housing unit. If a sleeping area of an existing residential housing unit is being remodeled and a permit is required, an approved smoke detector shall be installed. An approved smoke detector shall be installed in each guest unit in a motel or hotel which is not equipped with automatic fire extinguishing equipment. These ordinances do not supercede ordinances by municipalities, counties or localities or the fire code of any fire district, if such ordinances are equal to or greater than state requirements.

Arkansas

Current Status

Arkansas has no legislation applicable to residential housing. Legislation was passed to require smoke detectors in nursing homes.

Codes

Arkansas enforces the 1965 Arkansas State Fire Prevention and Building Code which has no provisions for smoke detectors. The state fire marshal's office is working with the Arkansas Department of Labor, the Arkansas state OSHA office, and other interested parties to revise the 1965 code, which will include provisions to require smoke detectors in occupancies of more than 15 persons — triplexes and apartment buildings. (Under Arkansas law, a building must house more than 15 persons to be under the jurisdiction of the fire code. However, new residences built by contractors for resale will have to comply with the code.) Existing structures undergoing remodeling efforts totaling 50 percent or more of the value of the building will also have to be brought into compliance.

Arkansas law requires legislative approval before a revised code can be adopted. The revised code was expected to be presented to the legislature in January, 1983.

1982 Bill Introductions

HB.954, which passed into law (Act 570, 1981), amends Sections 1 and 2 of Act 374, 1979. Act 374 required licensed nursing homes to install and maintain either a sprinkler system or a particle sensor devise system with visual signals outside each room by June 30, 1981. Act 570 repealed the June 30, 1981 deadline. Nursing homes that had not yet begun installation of an approved system at the time of passage were required to begin installation immediately.

Contact

Ray E. Carnahan
State Police
Fire Marshal Section
P.O. Box 4005
Little Rock, AR 72214
(501) 371-1846

California

Current Status

All new dwelling units are required to have smoke detection devices. Requirements for existing housing are handled on a local basis.

Codes

California enforces the State Housing Law which references the 1976 edition of the Uniform Building Code. The law includes jurisdiction over one- and two-family dwellings and apartment buildings.

1982 Bill Introductions

None

Contact

Ronald W. Bogardus, P.E.
State Fire Marshal
7171 Bowling Dr., Suite 600
Sacramento, CA 95823

Colorado

Current Status

Smoke detectors are required in all new residential, multifamily and manufactured construction, hospitals, nursing homes and other residential care facilities.

Requirements for smoke detectors in existing buildings is left to local jursidictions.

Codes

Colorado has no statewide fire code. The state enforces the 1979 edition of the Uniform Building Code, a mandatory minimum standard code. Local jurisdictions may adopt more stringent standards. Currently, the administrative process of adopting the 1979 edition of the UBC is almost completed.

For hospitals and other public institutions, a combination of the 1976 and 1973 editions of NFPA 101 are used.

1981 Bill Introductions

HB.1282, which would have given counties the authority to establish fire codes, died in committee.

Contact

Art Cucher
Division of Housing
Denver, CO 80203
(303) 866-2033

Bernie Nash
Fire Marshal
Aurora, CO
(303) 695-7110

Connecticut

Current Status

New single-family dwellings and multifamily residential buildings must be equipped with smoke detectors. Hospitals and convalescent homes not equipped with sprinkler systems must be equipped with smoke detectors.

Codes

The fire safety code, which is administered by the state fire marshal's office, has no jurisdiction over single-family dwellings. The requirements for single-family dwellings are found in the general statutes. Smoke detectors are required in three or more residential units. This requirement is retroactive.

1982 Bill Introductions

None

Contact

Captain William R. Kirkby
Deputy State Fire Marshal
294 Colony St.
Meriden, CT 06450
(203) 238-6620

Delaware

Current Status

Delaware has no statewide smoke detector legislation applicable to residential buildings.

Codes

The state fire marshal's office enforces the "Fire Prevention Rules and Regulations for the State of Delaware." It is based on the 1973 NFPA's Fire Prevention Code. There is no state building code.

1981 Bill Introductions

SB.97, which would have required any new, extensively altered, or renovated residential building or mobile home to be equipped with smoke detectors, did not pass.

Contact

J. Benjamin Roy, Jr.
State Fire Marshal
P.O. Box 109
Dover, DE 19901
(302) 736-4393

Florida

Current Status

Florida has no smoke detector legislation applicable to residential buildings, except public lodging establishments.

Codes

Florida has a fire code, promulgated by the Florida Fire Safety Board which makes rules and regulations.

Florida enforces the mandatory State Minimum Building Code which is based on the 1981 edition of the Southern Building Code, the National Building Code, and the one- and two-Family Dwelling Code. The portions of the codes requiring smoke detectors in residences were not adopted.

1983 Bill Introductions

1983 mandatory residential smoke detector bill failed. Sprinkler system and smoke detector retrofit bill, including detectors for the hearing impaired, passed.

Contact

Dennis Dewar, Director
State Fire Marshal's Office
Larson Bldg.
Room 471
Tallahassee, FL 32301

Georgia

Current Status

Georgia has no smoke detection code applicable to residential housing. Smoke detectors are required in motels, hospitals, and nursing homes in a manner prescribed by the 1976 edition of NFPA *101*.

Codes

The state fire marshal's office enforces the 1976 edition of the NFPA *101* which is part of the 1949 Georgia Safety Fire Act, as amended in 1968.

1981 Bill Introductions

HB.9, which would require smoke detectors in apartment buildings, was still in Committee when the legislature adjourned.

Contact

Bob R. Gore, Jr.
State Fire Marshal
State Capitol
Atlanta, GA 30334
(404) 656-2064

Hawaii

Current Status

There is no smoke detector legislation at the state level in Hawaii because the state no longer promulgates codes. However, each county and island requires smoke detectors in nursing homes, hotels, motels, and new residential construction. Each also requires existing buildings to be equipped with smoke detectors when renovation costs exceed $1,000.

Codes

Each county and island in Hawaii has adopted the 1978/79 edition of the Uniform Fire Code.

1981 Bill Introductions

None

Contact

Melvin Nonaka, Fire Chief
Fire Department
S. Beretania St.
Honolulu, HI 96814

Illinois

Current Status

Illinois has no statewide smoke detector legislation for residential buildings. Automatic smoke detection systems are required for nursing homes, hospitals, and other institutional buildings. Hotels with more than 2 stories or an occupancy of more than 20 persons are required to install smoke detectors which must plug into an electrical outlet and which must contain a stand-by battery. Smoke detection systems are required in the sleeping rooms and the halls of all institutional buildings.

Code

Illinois developed and enforces its own code, "Illinois Rules and Regulations for Fire Prevention and Safety."

1981 Bill Introductions

None

Contact

Jack Henry Carter, Sr.
State Fire Marshal
Division of Fire Prevention
3150 Executive Park Dr.
Springfield, IL 62706
(317) 232-2222

Indiana

Current Status

Indiana requires smoke detectors in all new homes, mobile homes, boarding houses, hotels and motels.

Codes

Indiana has adopted the 1979 edition of the Uniform Building Code. A municipality may adopt codes other than those adopted by the state as long as the provisions are not in conflict with the state code.

1981 Bill Introductions

S.349 would have created a "hotel and motel fire safety advisory study committee" to study fire safety devices and systems and tax incentives to promote compliances. It passed the Senate and was referred to the House where it died in committee.

SCR.3 would have directed the State Fire Prevention Commission to draft a fire prevention code for the state by July 1, 1983. The bill died in committee.

Iowa

Current Status

There are no statewide mandatory requirements for smoke detectors in non-commercial residential buildings.

Codes

Iowa has a state building code and has also adopted NFPA 101. The state building code requires smoke detectors in new buildings; but it is not mandatory for cities and localities to adopt the code.

Iowa Statute

Requires a smoke detector in each sleeping room and corridor of hotels, motels, dormitories, apartments and other residential buildings.

The state fire marshal may promulgate fire safety rules and make non-compliance with the provisions of the law a misdemeanor.

Contact

Wilbur R. Johnson
State Fire Marshal
State Office Building
523 E. 12th St.
Des Moines, IA 50319
(515) 281-5821

Kansas

Current Status

Kansas has no statewide requirements for smoke detectors in residential buildings.

Codes

Kansas has adopted portions of the 1976 edition of NFPA *101*. Most localities have adopted parts of the Uniform Building Code. There is no statewide building code.

1981 Bill Introductions

None

Contact

Edward C. Redmon
State Fire Marshal
Mills Bldg.
109 W. 9th St.
Topeka, KS 66612
(913) 296-3401

Kentucky

Current Status

There are no statewide mandatory requirements for smoke detectors in single-family residential dwellings. New hotels and motels must be equipped with smoke detectors; existing hotels and motels are exempt. New and existing apartment buildings and duplexes are required to have smoke detectors. In all new construction, smoke detectors must be hard wired into the electrical system. In existing construction, smoke detectors must be powered from the main power source, i.e., an electrical outlet.

Codes

The state has adopted the Kentucky Building Code based on the BOCA code. Within 6 months, the state fire marshal's office expects to adopt the 1981 edition. The building code is mandatory in Kentucky for all construction except single-family homes. The state fire marshal's office also enforces the 1979 edition of NFPA *101* for hospitals and other institutional care facilities. The office estimated that 75 percent of the population lives in areas which have adopted the single-family portion of the Code.

1982 Bill Introductions

A new fireworks law was passed during the 1982 session.

Contact

Gayle S. Horn
State Fire Marshal
U.S. 127 Office Building, S
Frankfort, KY 40601
(502) 564-3626

Louisiana

Current Status

Hospitals and other institutional care facilities must be equipped with smoke detectors. Louisiana has no statewide requirement for smoke detectors in residential buildings; however, an administrative act passed in 1983 requires all existing residential dwellings, other than one- and two-family, to have smoke detectors. This act allows for battery-operated detectors in existing facilities in lieu of NFPA 101, *Life Safety Code* requirement for electric.

Codes

Louisiana enforces the most current edition of the *Life Safety Code* (NFPA *101*).

Contact

Carrol L. Herring
State Fire Marshal
1033 North Lobdell Blvd.
Baton Rouge, LA 70806
(504) 925-4911

Maine

Current Status

Legislation requires smoke detectors in new single-family dwellings and new existing multi-unit apartment buildings. Efffective July 1, 1981, all hotels with more than 15 sleeping rooms for hire and taller than two stories must be equipped with smoke detectors. Hospitals, nursing homes, and day-care facilities must also be equipped with smoke detectors under the *Life Safety Code* (NFPA *101*). Public Law Chapter 399, which requires smoke detectors in all multi-unit apartment dwellings and new single-family residences, went into effect September 18, 1981.

Codes

Maine enforces the 1981 edition, NFPA *101* for certain occupancies.

1982 Bill Introductions

None

Contact

Don Bisset
State Fire Marshal
Department of Public Safety
99 Western Ave.
Augusta, ME 04333
(207) 289-2481

Maryland

Current Status

Effective July 1, 1982 occupants of all one-, two-, and three-family dwellings built prior to 1975 are required to install smoke detectors powered by battery or electricity. Residential structures constructed subsequent to 1975 are required, through earlier legislation, to be equipped with permanently installed electrically powered detectors.

House Bill 1299 signed into law by Governor Harry Hughes on May 24, 1983 provides that dwelling units within existing hotels and multifamily buildings that were exempt from the provisions of this section because there were 10 units or more constructed before 1975 which conformed with the existing requirements of the *Life Safety Code* must have smoke detectors installed by January 1, 1984. Consequently, for all intents and purposes *all* dwelling units must be equipped with smoke detectors by January 1, 1984. In most cases landlords are responsible for installation and, in certain cases, for maintenance of the detector.

Enforcement of the apartment, hotel and multifamily provisions of this law will be through inspections by local and state fire code enforcement personnel. Publicity surrounding the enactment of this law will, it is envisioned, bring about a high degree of compliance.

Slight differences in multifamily smoke detector requirements exist in Howard, Montgomery, and Prince George's Counties and in Annapolis. Residents in these jurisdictions should check with local fire authorities. Single family detector requirements became effective July 1, 1978 in Montgomery County.

Codes

The Fire Prevention Commission has the authority to amend, promulgate, and repeal the regulations of the State Fire Prevention Code. The state fire marshal is authorized to enforce the code.

1982 Bill Introductions

HB.1299 described above passed into law.

Contact

State Fire Marshal
301 W. Preston St.
Baltimore, MD 21201
(301) 383-2520

Massachusetts

Current Status

Every building or structure not exceeding seventy feet in height erected or altered for residential purposes must be protected with an automatic fire warning system which must feature an automatic smoke detection system. This provision applies only to buildings constructed or altered after January 1, 1975.

One smoke detector must be installed on the ceiling of each stairway leading to the floor above and one smoke detector must be installed outside each separate sleeping area if there are no more than 2 dwelling units. For a building with more than 2 dwelling units, smoke detectors must also be placed in all common hallways of a structure.

Effective January 1, 1982, all buildings used for residential purposes must be equipped with smoke detectors by the owner at the time of sale or transfer.

Code

Massachusetts enforces the Massachusetts State Building Code. The Board of Fire Prevention Regulation has the responsibility of formulating and promulgating regulations.

1982 Bill Introductions

None

Contact

Joseph O'Keefe
State Fire Marshal
Department of State Police
1010 Commonwealth Ave.
Boston, MA 02215
(617) 566-4500

Michigan

Current Status

Michigan has no statewide requirements for smoke detectors in residences. Through various codes governing specific occupancies, Michigan does require smoke detectors in child care centers, hospitals, nursing homes, adult foster care facilities, children's camps, and schools.

Codes

Michigan enforces the 1978 edition of the Basic Building Code. The state also enforces the Fire Prevention Act of 1981.

1983 Bill Introductions

SB.251 would require automatic smoke detection systems in new residential buildings built or used in the state.

Contact

William Rucinski, Captain
Department of Public Safety
Chief Fire Marshal Division
7150 Harris Dr.
Lansing, MI 48913
(517) 322-1924

Minnesota

Current Status

Smoke detectors are required in all new and existing residential occupancies, including rental residential, hotels, apartments buildings, and college dorms. The responsibility for maintaining smoke detectors in rentals is given to owners and managers.

There is a provision that requires smoke detectors in new construction to be wired into the electrical system. Rules have been promulgated specifying placement of smoke detectors.

Codes

Minnesota enforces the Minnesota Building Code. Local ordinances may not supercede any state ordinance.

1982 Bill Introduction

None

Contact

Wes Werner
State Fire Marshal
1246 University Ave.
St. Paul, MN 55104
(612) 296-7641

Mississippi

Current Status

Mississippi requires smoke detectors in new commercial residential buildings which include apartment buildings, hotels, and motels. There are no requirements for one- and two-family dwellings.

Codes

The Mississippi Fire Prevention Code was adopted in July, 1978. Local jurisdictions are required to adopt the Code but may include local ordinances which are more stringent than the state fire code. The code has no provisions for one- and two-family dwellings.

1982 Bill Introduction

None

Contact

John Chamblee
Department of State Fire Marshal
P.O. Box 22542
Jackson, MS 39205
(601) 354-6304

Missouri

Current Status

Missouri has no statewide requirements for smoke detectors in residences. Smoke detectors are required in child day-care facilities, day-care homes, nursing homes, and hospitals. These systems must be wired into the electrical system.

Code

There is no statewide fire code.

1981 Bill Introductions

HB.593 would have required all hotels, motels and other establishments providing lodging to transient guests to be equipped with an automatic fire detection and alarm system. In addition, each room within such hotel, motel, or establishment would have had to be equipped with an automatic smoke detector. The bill died after a committee report.

Contact

James J. Helbig
State Fire Marshal
Department of Public Safety
621 E. Capitol
Box 844
Jefferson City, MD 65102

Montana

Current Status

Montana requires smoke detector devices in new residential construction and in new and existing motels and hotels with at least 15 sleeping rooms.

Codes

Montana enforces the Uniform Building Code and the 1982 Uniform Fire Code.

1981 Bill Introductions

None

Contact

Robert Kelly
Chief, Fire Marshal Bureau
303 No. Roberts, Rm. 371
Helena, MT 59620
(406) 449-2050

Nebraska

Current Status

A smoke detector bill, LB.296, was passed this session. Smoke detectors will be required in dwellings, apartment buildings, hotels, lodging houses, dormitories, and mobile homes (certain mobile homes and manufactured housing units are exempt). Every dwelling unit and guest room built or remodeled on or after January 1, 1982 must be provided with one or more operating smoke detectors. Every guest room and dormitory constructed prior to January 1, 1982 must be provided with one or more operating smoke detectors on or before January 1, 1984. Dwelling units within a dwelling or apartment house constructed after January 1, 1982, must be provided with one or more smoke detectors at the time of sale or remodeling. Owners of rental dwelling units are responsible for supplying, installing, maintaining, and testing the smoke detectors. Occupants are responsible for replacement of the battery or the unit if the unit was operable when the occupant moved into the dwelling. LB.296A, which also passed this session, appropriates $40,000 to the state fire marshal to aid in carrying out the provisions of LB.296.

Codes

Nebraska has adopted the 1973 edition of NFPA *101* which is not mandatory statewide. With regards to the new law, political subdivisions in Nebraska may not adopt less stringent standards.

1981 Bill Introductions

LB.296, described above, is now law.
LB.296A, described above, is now law.

Contact

Wally Barnett
State Fire Marshal
301 Centennial Mall, S
Lincoln, NE 68508

Nevada

Current Status

Nevada requires smoke detectors in newly constructed residences, new sleeping quarters of apartments and hotels, and in public buildings. Legislation passed during the 1981 legislative session requires that existing hotels, motels, and apartment buildings have smoke detectors in each sleeping room.

Code

Nevada enforces the 1976 edition of the Uniform Building Code and the 1973 edition of NFPA *101*. The state fire marshal's office has adopted the 1973 edition of the *National Fire Code*, where necessary to supplement the UBC. Application is statewide.

1982 Bill Introductions

SB.214, which requires operators and owners of existing hotels and motels with at least 6 rooms, and apartment buildings with at least 3 dwelling units to equip each room with an approved smoke detector, passed. All affected buildings have been inspected and smoke detectors installed in 92 percent of buildings. Full compliance, however, is not mandated until June 1984.

Contact

Tom J. Huddleston
State Fire Marshal
Capitol Complex
Carson City, NV 39710
(702) 885-5911

New Mexico

Current Status

New Mexico requires smoke detectors in all residential construction, including hotels and motels. Existing residences must comply with the code when additions exceeding $1,000 are made. Compliance is required of existing buildings if certain alterations are made. In new construction, smoke detectors must be hard wired into the electrical system. One detector must be installed in each sleeping room. Public occupancies such as schools, hospitals, office buildings, and nursing homes are required to comply with the smoke detector requirements in NFPA *101*.

Codes

New Mexico has adopted the 1979 edition of the Uniform Building Code, which is administered through the Construction Industries Division. Local jurisdictions are required to enforce this code but may adopt more stringent provisions. The 1979 edition of NFPA *101* was adopted through the authority of the state fire marshal's office.

1981 Bill Introductions

None

Contact

Manual Garcia
Superintendent of Insurance
State of New Mexico
Fire Marshal's Office
P.O. Box 1269
Santa Fe, NM 87501
(505) 827-2357

New Hampshire

Current Status

Prior to the 1981 legislative session, New Hampshire required only new residential buildings of 70 feet or more in height to have smoke detection systems. A law passed this session requires automatic fire warning systems in all new single-family dwelling units built after December 31, 1981.

Codes

The fire marshal's office enforces the 1976 edition of the Fire Safety Code.

1981 Bill Introductions

HB.262 would require automatic fire warning systems in all new single-family dwelling units built after December 31, 1981. The bill was passed and signed by the governor June 29, 1981. The law, which can be found in Chapter 497, 1981 Statutes, became effective August 28, 1981.

Contact

Raymond Dewhurst
State Fire Marshal
Department of Safety
Concord, NH 03301
(603) 271-3336

New Jersey

Current Status

All new residential buildings and all multiple-dwelling units (hotels, motels, and apartment buildings) must be equipped with smoke detectors. The New Jersey law requires smoke detectors to be wired into an active electric circuit. The owner or manager of a building is responsible for maintenance, and in some cases, testing of the smoke detection units. The guide also gives specific direction for location and placement of the smoke detection units.

Codes

New Jersey enforces the 1978 edition of the Basic Building Code which is not subject to local administration.

1981 Bill Introductions

None

Contact

Charles Decker, Chief
Bureau of Construction Code Enforcement
P.O. Box 2768
Trenton, NJ 08625
(609) 292-6364

New York

Current Status

There are no statewide requirements for smoke detectors in residential buildings (due to recent changes in the New York State Sanitary Code). Hotels and motels which exceed 3 stories in height and have 75 or more sleeping rooms must be equipped with smoke detectors.

Codes

New York State has adopted the 1978 edition of the State Fire Prevention Code, which is designed to supplement the State Building Construction Code. Municipalities must adopt a resolution or local law accepting the applicability of the codes. These codes have been adopted by about 180 communities. New York has also adopted the one- and two-Family Dwelling Code which has provisions for smoke detectors in new single-family dwellings and multiple dwellings. About 725 communities have adopted this code.

1981 Bill Introductions

None

Contact

Francis A. McGarry, Director
Division of Fire Prevention and Control
New York Department of State
Albany, NY 12232
(518) 473-3590

Bennet Seslekof, Director
Codes Bureau
Two World Trade Center
New York, NY 10047
(202) 488-7080

North Carolina

Current Status

North Carolina requires smoke detectors in all new residential buildings through a mandatory statewide building code. Recent legislation requires owners of high-rise buildings to install smoke detection systems.

Codes

North Carolina has a mandatory state building code (based on the National Building Code of Canada) with stringent amendments for existing high-rise buildings which was adopted by the North Carolina Building Code Council in 1979. The code was challenged in court and stricken because of questions of legislative intent in giving the Council the authority to adopt codes. The 1981 legislature passed a bill specifically including the existing high-rise building amendments to the state code.

Contact

Lee Hauser
Deputy Commissioner
Box 26387
Raleigh, NC 27611
(919) 733-3901

North Dakota

Current Status

There are no requirements for smoke detectors in residential buildings. Hotels and motels must have smoke detection systems in each sleeping room. For the hearing impaired, at least one sleeping room must be equipped with a smoke detector capable of producing 85 decibels of sound at 10 feet and capable of flashing a 250-watt bulb for 5 minutes. Hospitals are also required to have smoke detection systems.

Codes

The state fire code and the state building code, which are mandatory throughout the state, are based on the 1982 edition of the Uniform Building Code. Both codes may be amended by localities as long as the amendments meet or exceed those of the State Building Code. Provisions for hospitals are found in the North Dakota Administrative Code. Code was promulgated by the State Fire Marshal by September, 1983.

1982 Bill Introductions

None

Contact

John D. Jansen, Jr.
State Fire Marshal
P.O. Box 1292
Bismarck, ND 58502
(701) 224-2434

Ohio

Current Status

Ohio has no smoke detector requirements for one-, two-, and three-family residences. New and existing sleeping rooms in apartment buildings, hotels, and motels built after 1972 must be equipped with smoke detectors. All buildings over 75 feet in height are required to have smoke detection systems.

Codes

Ohio has a mandatory statewide building code based on the BOCA Building and Fire Codes. The code is part of the Ohio statutes. Sections of the BOCA code that conflict with the provisions of the Ohio Revised Code have been deleted. Local jurisdictions can adopt more stringent requirements than the state code. Local jurisdictions that adopt the state code may enforce it. Where the local jurisdiction does not adopt the code, the state enforces the code.

1981 Bill Introductions

None

Contact

Pete Ryan
State Fire Marshal
8895 E. Main St.
Reynoldsburg, OH 43068
(814) 864-5510

Oklahoma

Current Status

Oklahoma has no smoke detector requirements for residences. Smoke detectors are required in hospitals and other institutional care facilities.

Codes

Oklahoma has adopted the 1981 edition of BOCA. The state fire marshal's office has adopted the 1981 edition of NFPA *101* with all its smoke detectors' requirements.

1982 Bill Introductions

None

Contact

Jack C. Sanders
State Fire Marshal
4030 N. Lincoln Blvd.
Suite 100
Oklahoma City, OK 73105
(405) 424-4371

Oregon

Current Status

New residential buildings must be equipped with smoke detectors. All structures undergoing remodeling which costs $1,000 or more must be equipped with smoke detectors. In addition, all existing residential buildings, except owner-occupied single-family homes, must be retrofitted. All rental dwelling units including hotels and dormitories must comply. Owner-occupied single-family housing must be retrofitted upon change of ownership. Details for placement and maintenance are included.

Codes

The state building code is a mandatory minimum/maximum code. All buildings, except residential buildings with less than 3 units, are regulated by the state fire marshal's office, through the Oregon Fire and Life Safety Structural Code. This code is based on the 1982 edition of the Uniform Building Code. The Oregon revised statutes gave the fire marshal's office the authority to adopt rules and regulations. Under an administrative rule, the fire marshal's office has adopted the 1982 edition of the *Uniform Fire Code*.

1982 Bill Introductions

None

Contact

Olin L. Greene
State Fire Marshal
103 Labor & Industries Bldg.
Salem, OR 97310

Pennsylvania

Current Status

There are no requirements for smoke detectors applicable to residential housing built on-site. Manufactured or industrialized housing must be equipped with smoke detectors as must personal care homes, boarding homes, and group (alcohol and juvenile treatment) centers.

Codes

The Industrialized Housing Division of the Bureau of Housing and Development, Department of Community Affairs, enforces the 1978 edition of the Basic Building Code for manufactured or industrialized housing. Other requirements are enforced through the Pennsylvania Fire and Panic Regulations by the Bureau of Occupational and Industrial Safety, Department of Labor and Industry. The F/P Regulations were given a complete rewriting effort in 1982 but have not yet been reprinted.

1982 Bill Introductions

None

Contact

Thomas Dinsmore, Chief
Building Division
Bureau of Occupational & Industrial Safety
Department of Labor & Industry
Harrisburg, PA 17120
(717) 787-3806

Rhode Island

Current Status

All new and converted buildings used for residential occupancy must be equipped with smoke detection systems which must be hard wired into the electrical system. Child day-care centers, adult sheltered care homes, and places of public assembly must also be equipped with smoke detection systems. Existing structures must be retrofitted when a change in use or type of occupancy occurs.

Codes

The state fire marshal's office enforces the Rhode Island State Fire Safety Code which was enacted into law by the general assembly. The fire marshal's office is given the responsibility for new residential construction. Existing residential buildings are the responsibility of local minimum housing officers who enforce the Occupancy and Maintenance Codes. The smoke detector requirement in the 1975 edition of the BOCA code is used for high-rise buildings. The smoke detector requirements of the 1973 edition of the *Life Safety Code* are used for hospitals and nursing homes.

1982 Bill Introductions

None

Contact

Earl F. Shannon
Division of Fire Safety
1270 Mineral Spring Ave.
North Providence, RI 02904
(401) 277-2335

South Carolina

Current Status

Every dwelling and dwelling unit within a hotel, motel, condominium, and apartment house must be provided with a smoke detector. Specific guidelines for placement and location are provided. There are no requirements of one- and two-family dwellings.

Codes

South Carolina enforces the 1976 editions of the Southern Standard Building Code and the Standard Fire Code. Municipalities may adopt more stringent regulations if needed.

1981 Bill Introductions

None

Contact

Richard S. Campbell, P.E.
State Fire Marshal
1109 Mellview
Columbia, SC 29201

South Dakota

Current Status

There are no statewide requirements for smoke detectors in residential dwellings. The fire marshal's office highly recommends smoke detection systems be installed in apartment buildings, but this is voluntary. The health department enforces requirements for smoke detectors in hospitals, nursing homes, and other institutional facilities.

Codes

South Dakota has adopted the public building portion of the 1979 edition of the Uniform Building Code. (This code does not cover private dwellings.) The fire marshal's office has adopted the 1979 Uniform Building Code and Volumes 1-12 of the 1981 edition of the *National Fire Code*. The health department enforces portions of the 1981 edition of NFPA *101*.

1982 Bill Introductions

None

Contact

Jim Flippin
State Fire Marshal
118 W. Capitol
Pierre, SD 57501
(605) 773-3562

Tennessee

Current Status

There are no requirements for smoke detectors applicable to any type of residential buildings. Only child day-care centers are required statewide to have smoke detection systems.

Codes

The state fire marshal's office enforces the 1981 edition of NFPA *101*. The state has also adopted the 1981 edition of the Standard Building Code. Neither code is mandatory, except in educational facilities, places of assembly over 300, and highrises. The office is in the process of adopting the 1981 editions of the *Life Safety Code* and the Standard Building Code.

1982 Bill Introductions

None

Contact

Ray Crouch
Fire Information Officer
Tennessee Building, Room 410
6th and Church St.
Nashville, TN 37219
(615) 741-2981

Texas

Current Status

Legislation requires smoke detectors in all rental or leased dwelling units. Dwelling units constructed after September 1, 1981, must have smoke detectors installed prior to commencement of possession by the tenant. Dwelling units constructed on or before

September 1, 1981, must have smoke detectors installed on or before September 1, 1984. Nursing homes and hospitals must have smoke detectors.

Legislation passed in the First Called Special Session, 1983, requires the installation of smoke detectors in sleeping quarters of hotels, motels and boarding houses. (Effective January 1, 1984)

Codes

There is no statewide fire or building code in Texas. Nursing and convalescent homes are regulated by the Nursing and Convalescent Home Division of the Texas Department of Health which enforces NFPA *101*.

Contact

Ernest A. Emerson
State Fire Marshal
1110 San Jacinto St.
Austin, TX 78786
(512) 475-4203

Utah

Current Status

Utah has no statewide requirements for smoke detectors in residential buildings. Hospitals, nursing homes, schools, places of public assemblage, and state-owned buildings must be equipped with smoke detectors.

Codes

Utah enforces the 1979 editions of the Uniform Building Code, the Uniform Fire Code, and the Mechanical Code. The fire codes are not mandatory in the state.

1981 Bill Introductions

None

Contact

Steve M. Kennedy
State Fire Marshal
101 State Capitol
Salt Lake City, UT 84114
(801) 533-5318

Vermont

Current Status

Vermont has no requirements for smoke detectors in residential buildings.

Codes

Vermont enforces the 1976 edition of NFPA *101* that covers public buildings.

1981 Bill Introductions

None

Contact

Richard D. Jones
Director of Fire Prevention
Department of Industry & Labor
118 State St.
Montpelier, VT 05602

Virginia

Current Status

Virginia requires smoke detectors in new residential construction. As of July 1, 1981, permissive legislation allows localities to adopt provisions requiring smoke detector systems to be installed in buildings retroactively.

Codes

Virginia has adopted the 1981 edition of the Basic Building Code which is a mandatory minimum/maximum code. Virginia also has a Fire Safety Law that has no provisions for smoke detectors. The code is currently under review and the state fire marshal's office may petition the legislature to revise the codes and the Fire Safety Law.

1982 Bill Introductions

The 1982 legislature passed a bill requiring smoke detectors to be installed in all college and university dormitories by January 1, 1984.

Contact

Howard Summers
State Fire Marshal
205 N. 4th St.
Richmond, VA 23209
(804) 786-4751

Washington

Current Status

The state of Washington requires smoke detectors in all new residential buildings. Effective December 31, 1981, smoke detectors are required in all existing buildings other than owner-occupied; that is, all rentals must be equipped with smoke detectors.

Codes

The 1976 Uniform Building Code is the state building code which is mandatory statewide. This code or subsequent editions are enforced by each city, town, and county in the state of Washington.

1982 Bill Introductions

None

Contact

Thomas Brace
Director, Division of State Fire Marshal
Insurance Building
Olympia, WA 98504
(206) 753-3605

West Virginia

Current Status

Smoke detectors are required in corridors of apartment buildings and in nursing homes, hospitals, educational, penal, and other institutional occupancies.

Codes

The state fire marshal's office enforces the State Fire Code which incorporates the 1983 National Fire Code. The code excludes one- and two-family dwellings.

1982 Bill Introductions

None

Contact

Walter Smittle, III
State Fire Marshal
1800 Washington St., E
Charleston, WV 25305
(304) 348-2191

Wisconsin

Current Status

All new residential buildings are required to be equipped with smoke detectors. Mobile homes and manufactured housing must also be equipped with smoke detectors.

Codes

Two codes regulate buildings in Wisconsin. The one- and two-Family Dwelling Code is administered through the Department of Labor, Industry and Human Services. This code is also used for mobile and manufactured homes. Commercial buildings, including apartment buildings, are under the jurisdiction of the Department of Labor.

1981 Bill Introductions

None

Contact

Larry Litchfield
Department of Labor, Industry & Human Services
Safety of Building Division
201 E. Washington Ave.
Madison, WI 53701
(608) 266-3315

Wyoming

Current Status

Wyoming requires smoke detectors in all new residential buildings, including hotels and motels. Existing buildings must be retrofitted when remodeling requires a building permit and costs more than $1,000 or when 1 or more sleeping rooms are added to the building.

Codes

Wyoming has adopted the 1979 Uniform Building Code which is mandatory throughout the state. Municipalities may adopt more stringent restrictions.

1981 Bill Introductions

None

Contact

Billy M. Weckwerth
State Fire Marshal
Room 117, Hathaway Bldg.
Cheyenne, WY 82002
(307) 777-7288

Legislative Procedures

Ticket Citation Systems

The following departments have personnel experienced with managing ticket citation systems, and they may be contacted for information about those systems.

Division of Fire Prevention
2215 W. Old Shakopee Rd.
Bloomington, MN 55431
(612) 887-9633

Department of Fire
300 N. Main
Dayton, OH 45402
(513) 225-5344

Oklahoma City Fire Department
820 Northwest 5
Oklahoma City, OK 73106

Palm Springs Fire Department
300 N. El Cielo Rd.
Palm Springs, CA 92262
(714) 323-8181

Rancho Cordova Fire District
10595 Fulsom Blvd.
Rancho Cordova, CA 95670
(916) 363-3131

Reno Fire Department
200 Evans Ave.
Reno, NV 89501
(702) 785-2300

St. Paul Fire Department
101 E. 10th St.
St. Paul, MN 55101
(612) 224-7811

For an example of model legislation for establishing a citation program, see the 1980 Annual Report of the Uniform Fire Code Committee of the Western Fire Chiefs Association, published in the *Western Fire Chief*, July, 1980, pp. 53-58.

Residential Fire Safety

Home Certification Programs

The following departments may be contacted for information about home certification programs.

Westland Fire Department
36435 Ford Rd.
Westland, MI 48185
(313) 721-2009

Building Department
Westland, MI 48185
(313) 721-2009

Residential Code Enforcement Through Occupancy Permits

The following department may be contacted about residential code enforcement.

Director
Office of Planning and Development
69801 Delmar Blvd.
University City, MO 63130
(314) 862-6767

Remote Alarms

The following people may be contacted for information about cable systems that provide emergency alarm service by state, community, company, and type of service provided. For further information see: David B. Gratz and Ramond E. Hawkins, "Initial Report, A National Director of Automatic Detection, Suppression and Remote Alarm Systems," prepared for the Federal Emergency Management Agency, U.S. Fire Administration, August 1980.

Alabama
Red Bay TV Cable
Box 446
Red Bay
(205) 356-1241
Burglar Alarm and Police Surveillance
875 subscribers as of 1978

Alaska
M.2.P.D.C. Inc.
Star Route 50410
Fairbanks
(907) 372-4169
Fire, Burglar Alarm, Police Surveillance
1200 subscribers as of 1978

B.C. Cable Co., Inc.
Box 929
Juneau
(907) 486-3320
Fire Alarm
4,000 subscribers as of 1978

Arizona
Arizona Cable TV Inc.
Box 13741
Phoenix
(602) 257-0115
Fire and Burglar Alarm
145 subscribers as of 1977

Arizona Cable TV Inc.
Box 4185
Scottsdale
(602) 949-7852
Fire and Burglar Alarm
659 subscribers as of 1977

California
Dickinson Communication LTD.
18030 Beach Blvd.
Huntington Beach
(714) 842-4455
Fire, Burglar Alarm, Police Surveillance
number of subscribers unknown

Cable Service of Azuksa Inc.
916 Cherrystone Drive
Los Gatos
(408) 354-1880
Fire and Burglar Alarm
number of subscribers unknown

Florida
Computer Cable TV Inc.
1001 Roosmoor Circle
Coconut Creek
(305) 971-3500
Fire Alarm, Medical Alert, Police Surveillance
448 subscribers as of 1976

PGA Communications (planned)
address unknown
Palm Beach Gardens
(305) 627-1220
Fire and Burglar Alarms, Medical Alert, Police Surveillance

Selkirk Communications Ltd (planned)
address unknown
(305) 527-6600
Fire Alarm, Medical Alert, Police Surveillance

Georgia
City of Monroe, Water, Light and Gas Commission
215 N. Broad St.
Box 725
Monroe
(404) 267-3429
Fire and Burglar Alarm
1914 subscribers as of 1978

Kansas
Progressive Communications Inc.
Box 14
Burdett
Fire, Burglar Alarm, Police Surveillance
202 subscribers as of 1978

Lendsburg Cable TV
Box 18387
Wichita
(913) 227-2264
Fire and Burglar Alarm
204 Subscribers as of 1977

Smith Center Cable TV (planned)
Box 18387
Wichita
Fire and Burglar Alarm

Maryland
St. Charles CATV Inc.
St. Charles Communities
336 Post Office Rd.
Waldorf
(301) 843-8600
Fire and Burglar Alarm, Medical Alert
1859 subscribers as of 1978

Massachusetts
Colonial Cablevision of Revere, Inc. (planned)
334 Broadway
Revere
(617) 289-2288
Fire Alarm

New Hampshire
United Cable Co. of New Hampshire
Box 658
36 Hanover St.
Manchester
(603) 669-2115

New York
Rensselaer County Cablevision Corp.
Box 439
212 Broadway
Rennsselaer
(518) 293-6200
Fire Alarm, Emergency Alert
4205 subscribers as of 1978

North Carolina
Cablevision of Salisbury, Inc.
136 N. Green St., Box 1658
Salisbury
(704) 633-5484
Police Surveillance
2321 subscribers as of 1978

Ohio
Warner Cable of Columbus (planned)
Box 14468, 4284 N. High
Columbus
(614) 261-0001
Fire and Burglar Alarm, Medical Alert

Veacom Cablevision of Dayton (planned)
275 Leo St.
Dayton
(513) 223-8472
Fire and Burglar Alarm, Medical Alert

Tel Vu System Inc.
13765 N. Main St.
Weston
Burglar Alarm and Police Surveillance
150 subscribers as of 1975

Oregon
C.B. Schrock & Associates, Inc. (planned)
2040 S.W. 187th St.
Aloha
(503) 649-2718
Fire, Medical and Police Security

Pennsylvania
Block Mountain Telecable Inc. (planned)
47 Main St.
Dallas
(717) 675-1171
Fire and Burglar Alarm, Police Surveillance

South Carolina
Cencom Inc.
Box 21368
Columbia
(803) 772-4020
Fire and Burglar Alarms
75 subscribers as of 1977

Texas
GRB Communications Inc. (planned)
Route 4, 6537 S. Stemmons
Denton
(817) 497-4055
Fire and Burglar Alarm, Police Surveillance

Wisconsin
Northern Lights Cable Corp. (planned)
Box 224
Presque Isle
(715) 686-2938
Fire and Burglar Alarms

RVS Cablevision Corp. (planned)
2767 Mayfair Rd.
Wauwatosa
(414) 259-1234
Fire and Burglar Alarm, Police Surveillance

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Gerard, John C. and A. Terry Jacobsen, "Reduced Staffing: At What Cost?" *Fire Service Today*, September, 1981.

National Conference of Counties, "A Study of Alternative Funding Sources for the Fire Service," 1980.

O'Hagan, John T. (Associates), "Boston Fire Department System Study," March, 1982.

O'Leary, Brian, *The Fertile Stars*, Everest House Publishers, New York, NY, 1980.

Renfro, William L., "Managing the Issues of the 1980's," The Futurist, World Future Society, Bethesda, MD, August, 1982.

Sanders, Jack C., John C. Gerard, Harry Shaw, and Harry Carter, "Conservatism and Local Government: The Tax Squeeze and Local Fire Safety Delivery Systems," (A Panel Discussion), First Batterymarch Conference, Quincy, MA, June, 1981.

Simon, William E., *A Time for Action*, Berkley Publishing Corp., New York, NY, 1981.

Ulrich, Richard L., "The Fire Problem: Economic Impacts and Innovative Approaches," National League of Cities, Washington, DC, 1980.

Wilmot, Tom, "European Fire Costs - The Wasteful Statistical Gap," Association de Geneve, October, 1979.

Mini-Guide for Fire Protection Master Planning

Master planning is an on-going process that allows a community to determine the level of service it needs and desires from a fire protection system. Through community fire department interaction, the best combination of several programs available is selected to become the planned fire protection delivery system for the community. Continual evaluation of the plan allows for alteration of programs to meet unusual developments or the unexpected.

How Master Planning Works

The following is a brief overview of the major steps in the planning process. Steps indicated by * are major milestones in the process at which time approval, changes, and input are sought.

1. **Determine the need for master planning** Is the community getting the best fire protection for the tax dollar? Is the fire department getting sufficient support from city hall and the public?

2. **Get approval and support from community administrative office** (city manager, mayor, county board of supervisors, etc.) This support is vital for the success of master planning.

3. **Select planning team and advisory committee members** Personnel from the fire department, other agencies and the general populace should be considered.

*4. **Define the fire problem(s)** Through data analysis, community survey, fire incident review, etc.

*5. **Establish goals and objectives** Goals are broad, philosophical statements that reflect the mission of the fire department as well as the needs of the community. Objectives are more specific statements that suggest methods to reach a goal. Program alternatives are developed from each objective.

*6. **Select program alternatives** Alternatives for reaching each objective are reviewed by the Planning Team and selected according to approved selection criteria. The plan written for final approval contains the best combination of alternatives.

*7. **Seek approval and implement the plan** The community fire protection master plan needs the support of the citizens as well as elected officials and fire departments.

*8. **Evaluate periodically and revise as necessary** Evaluation is necessary to check the progress of the fire protection system being implemented. Because communities are constantly changing, new construction, shifts in population, and other variables affect fire protection. The master plan must reflect these changes to assure that the community is receiving the level of service it needs and deserves.

Where to Get Help

Technical assistance in master planning is available through NFPA's Technical Support Program (TSP). TSP can help communities gain a clearer understanding of their current fire problems and fire protection system. TSP can provide training in techniques for master planning and plan presentation as well as an assessment of the planning effort at various points in the process. In addition, the community planning team and fire officials have access to NFPA's Advisory Service for answers to technical questions involving code enforcement/inspection, investigation, and data analysis.

NFPA's Technical Support Program has assembled a cadre of specialists who have been involved in master planning and fire protection locally and regionally and who are ready to advise other local fire department and community leaders on how to increase the effectiveness of local fire protection.

The Technical Support Program can assist the community in solving its own fire protection problems. TSP may also help the community in seeking further assistance for a particular issue (such as fire station location) from trained fire protection engineers and others. In any case, TSP can help communities more clearly identify and define local fire protection problems and needs.

Inquiries concerning master planning or technical assistance should be directed to:
James C. Smalley, Manager
Technical Support Program
National Fire Protection Association
Batterymarch Park
Quincy, MA 02269
(617) 770-3000

Computer Use in the Fire Service

Among the applications of new technology that local fire departments have taken advantage of to assist and improve their operations are computer-based information systems. Computer systems have been used for management information reporting, resource planning, and operational support. Data management systems represent some of the most successful applications. Fire incident reporting systems such as the National Fire Protection Association (NFPA) Uniform Fire Incident Reporting System (UFIRS) and U.S. Fire Administration (USFA) National Fire Incident Reporting System (NFIRS) are among the best known. NFPA has also developed a computer-based Fire Inspection Reporting System (FIRS). Management planning and evaluation tools include Public Technology, Inc.'s Station Location Package, NFPA's Fire Alarm Assignment System (FAAS), and Computer-Aided Dispatch System (CADS).

Computers can serve a number of functions in the fire service. Many of these are record-keeping functions. Among them are:

incident reports
casualty reports
prefire plans
fire inspection reports
equipment and apparatus inventory
equipment and apparatus maintenance/test
personnel records
duty rosters
training records
property inventory
financial records/budget
time accounting

Other functions that can be served by computers are:

dispatching and status keeping
locating fire stations and apparatus
office automation/word processing
training simulation
arson prediction

Glossary

(Adapted from *Desktop Computing* which publishes a quarterly update of computer terminology.)

Some of the common terms encountered in the computer environment are explained here to assist in understanding.

BIT: The contraction of "binary digit." A bit always has the value zero or one. Bits are universally used in electronic systems to encode information, orders (instructions), and data. Bits are usually grouped in bytes (8).

BYTE: A group of eight bits treated as a unit.

COMPILER: A translation program that converts user-developed instructions into a set of binary instructions for execution by the computer.

CPU: Central processing unit. The computer module in charge of fetching, decoding, and executing instructions.

CRT: Cathode ray tube. A video screen on which data or information is displayed.

DISK: A round plastic platter on which data is stored.

DISK DRIVE: The machinery that contains and rotates a floppy diskette or hard disk onto which data is written and from which data is read.

DOCUMENTATION: Instructions and other explanatory materials supporting computer hardware and software.

DUMP: To copy the contents of memory or disk to video display, printer, or storage device so that it can be checked out in detail or kept as back-up.

FILE: A logical block of information, designated by name, and considered as a unit by a user. A file may be physically divided into smaller records.

I/O: Input/Output. The communication of information to and from a computer or peripheral device.

INPUT DEVICE: Any machine or piece of equipment associated with a computer that allows you to enter commands or information into the computer's Random Access Memory. A keyboard is an input device.

INTEGRATED CIRCUIT: A complex, microscopic circuit on a chip of silicon.

INTERFACE: The hardware and/or software required to interconnect a peripheral device to a computer system.

KILOBYTE: "Kilo" means 1,000, but "Kilobyte" means precisely 1,024 bytes.

LANGUAGE: Any unified, related set of commands or instructions that the computer can accept. Low-level languages are difficult to use, but closely resemble the fundamental operations of the computer. High-level languages resemble English.

LOAD: The action of transferring data or a program into a memory area.

LOGIC: The term used to designate that part of the computer's circuitry that makes logical decisions.

LOGICAL DECISION: The capability of the computer to decide if one quantity is greater than, equal to, or less than another quantity and then use the outcome of that decision as a cue to proceed data in a given way with a program.

MACHINE LANGUAGE: Set of binary codes representing the instructions that can be directly executed by a processor.

MAIN MEMORY: The internal memory of the computer contained in its circuitry, as opposed to peripheral memory (diskettes, disks).

MENU: A list of programs or applications that are available by making a selection.

MERGE: A computerized process whereby two or more files are brought together by a common attribute, as zip codes in ascending numerical order.

MODEM: Modulator-demodulator. A device that transforms a computer's electrical impulses into audible tones for transmissions over a phone line to another computer. A modem also receives incoming tones and transforms them into binary impulses that can be processed and stored by the computer.

NETWORK: Several intelligent devices, such as microcomputers, interconnected so that they can send instructions and data back and forth among themselves, thus forming a larger computational system.

ON LINE: Directly connected to the computer system and in performance-ready condition.

OPERATING SYSTEM: Software required to manage the hardware and logical resources of a system, including scheduling and file management.

OUTPUT DEVICE: A machine that transfers programs or information from the computer to some other medium. Examples of output devices include printers, CRT screens.

PERIPHERAL: Any device connected to a computer. Examples include disk drives, tape drives, printers, CRTs.

PLOTTER: A mechanical device for drawing lines under computer control.

PROGRAM: A sequence of instructions that read, process, and/or display data in a form designated by the user.

RANDOM ACCESS: An access method whereby each word can be retrieved directly by its address.

RAM: Random Access Memory. That portion of a computer's main memory in which data can be randomly accessed.

READ: To accept data from a disk, card, etc., for storage and/or processing.

REAL TIME: Immediate and concurrent processing.

RECORD: A block of information unique unto itself. Many records about similar things constitute a file.

RESOLUTION: The quality of the image on the CRT.

ROM: Read Only Memory. That portion of a computer's main memory where program instructions are stored while being used.

SEQUENTIAL ACCESS: The method in which data is accessed by scanning blocks or records sequentially by some identifier.

SIMULATION: A computerized reproduction, image or replica of a situation or set of conditions.

SOFT COPY: Information contained magnetically in storage. Magnetic storage is on disk or tape.

SOFTWARE: Computer programs.

TRANSFERABLE SOFTWARE: Usable on many different computers.

WRITE: To transfer data from internal to external memory.

Types of Systems

Today, there are three types of computer systems that the fire service may have the opportunity to use. These are the mainframe-type computer, the mini-computer, and the microcomputer. Briefly defined, these are:

Mainframe: A large computer capable of handling many tasks at a single time with access to massive storage on disk or tape and supporting many terminals, printers, and other peripheral equipment. The mainframe requires special air conditioning and cooling and is housed in an environmentally controlled room. These systems generally require a staff of systems analysts, programmers, and operators to function.

Mini-computer: A medium size computer either dedicated to a single task or capable of performing multiple tasks simultaneously. Mini-computers can have access to massive storage on disk or tape and can support numerous terminals and other peripheral equipment. Generally, the mini-computer does not require the same amount of cooling and may or may not require housing in an environmentally controlled room.

Microcomputer: The microcomputer, sometimes called a personal computer, is designed to perform basically one task at a time. Storage is limited and usually involves floppy disks, although hard disks capable of more storage are now available. Microcomputers need neither special electrical connections nor special environmental control. A typical system involves a single terminal, a printer, and some storage device such as a floppy disk.

All three types of systems are currently used in the fire service. Where mainframe computers are used, they are generally shared with other municipal departments. The same is true with mini-computers, although some fire departments have mini-computers dedicated to supporting dispatch functions with record-keeping done on the back-up computer. Microcomputers are now beginnning to be used in the fire service for record-keeping functions.

Software

Three examples of readily available computer software for fire service record-keeping functions are the Uniform Fire Incident Reporting System, the National Fire Incident Reporting System, and the Fire Inspection Reporting System. A brief description of each system follows:

Uniform Fire Incident Reporting System (UFIRS)

The Uniform Fire Incident Reporting System (UFIRS) is a modern, scientific management tool that enables any municipal or county fire department to collect, classify, and report fire and other incident data using the community's computer as a tool to process the data. UFIRS provides important information for fire chiefs and community managers to use in planning, decision-making, and performance evaluation.

Classification of data within UFIRS is based on NFPA 901, *Uniform Coding for Fire Protection*, and the system is compatible with the National Fire Incident Reporting System (NFIRS) which is currently in use in many states.

UFIRS is a total package containing the computer programs, system documentation, and data collection forms to implement the system. The computer programs edit data, build and maintain files, and generate a series of 13 summary reports monthly. The documentation, which is contained in eight volumes, guides the user in the installation, operation, and support of the system; the training of users in preparing data, quality control, and using the results in management decision-making; and in handling the day-to-day operation within the fire department.

The 13 monthly summary reports can be used by the fire chief to:

- Spot rising trends in particular community fire problems.
- Identify and describe local fire problems.
- Plan the fire protection needs in the community.
- Support budget requests.
- Target fire prevention efforts to specific fire protection problems.
- Document and justify enforcement of local building, firesafety, and life safety codes.
- Evaluate code enforcement programs.
- Demonstrate the need for additional local ordinances on firesafety.
- Reduce fire casualties by identifying and correcting casualty-causing conditions.
- Allocate personnel and equipment more effectively.
- Schedule nonemergency activities to avoid peak emergency periods.
- Provide input for state reporting systems.
- Compare fire protection and prevention problems and solutions with those of other communities.

UFIRS is a tested and proven way to aid in the planning, decision-making, and problem-solving so necessary with each one of these management responsibilities.

Fire departments where UFIRS is currently in use include:

Albuquerque, NM
Anaheim, CA
Anne Arundel County, MD
Baltimore County, MD
Bellevue, WA
Berkeley, CA
Chesterfield County, VA
Columbia, MO
Dallas, TX
Denver, CO
Elizabeth, NJ
Everett, WA

Fort Worth, TX
Fresno, CA
Greensboro, NC
Houston, TX
Jacksonville, FL
Kansas City, MO
Kitchener, Ontario
Lansing, MI
Lincoln, NE
Linden, NJ
Louisville, KY
Madison, WI
Mountain View, CA
New Orleans, LA
Oakland, CA
Palo Alto, CA
Pittsburgh, PA
Portsmouth, VA
Rockford, IL
Sacramento, CA
San Jose, CA
Santa Barbara County, CA
Saskatoon, Saskatchewan
Syracuse, NY
Torrance, CA
Tulsa, OK
Wichita, KS

UFIRS was originally developed by the NFPA with funding from the U.S. Department of Housing and Urban Development. The NFPA has continued to maintain and upgrade the system. Further information on UFIRS and its application in a community may be obtained from Carl E. Peterson, National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

National Fire Incident Reporting System (NFIRS)

The National Fire Incident Reporting System (NFIRS) is an incident data collection system designed to process data from local fire departments at the state level, to pass that data base on to the federal level for use in studying the national fire problem, and to provide summary reports for use by state and local governments in better understanding their fire problem. Developed and administered by the Federal Emergency Management Agency, the system is operational or in the process of installation in 40 states. In addition, several large cities have installed the system on a computer in their communities and are using it as the basis of a local reporting system.

NFIRS is based on the work of the NFPA Technical Committee on Fire Reporting, utilizing the definitions, terminology, and data classification system presented in NFPA 901, *Uniform Coding for Fire Protection* and the forms and instructions presented in NFPA 902M, *Fire Reporting Field Incident Manual.*

Local communities with automated reporting systems based on NFPA 901, whether UFIRS, NFIRS, or a locally developed system feed information directly to the state on computer tape. Other fire departments submit copies of their fire reports directly to the state where the data is keypunched and processed.

The system is similar to UFIRS in that it contains 1) the computer programs to build and maintain a data base and to report from that data base; and 2) the support documentation for installation, training, operation, and use of data.

Further information on the National Fire Incident Reporting System can be obtained from the Federal Emergency Management Agency, Washington, DC 20472.

Fire Inspection Reporting System (FIRS)

The NFPA Fire Inspection Reporting System (FIRS) is designed for the collection, storage, and processing of inspection data and the scheduling of periodic inspections according to local policy. All data (occupancy, description, activity, and violations) are collected on a standard form during an inspection. A convenient pocket-sized inspection manual is compiled that systematically organizes potential code violations by occupancy, allowing for more comprehensive and standardized inspections. After the inspection forms are completed, they are (computer) processed according to local needs.

A series of management reports are produced that relate to inspection activity and prevention personnel resource allocation. In addition, separate master file listings can be maintained about occupancies currently under inspection, all occupancies to be inspected, and when there are outstanding violations to be corrected during follow-up reinspections. FIRS shows the manager:

- What is inspected, where, when, and by whom.
- What code violations are corrected by type, number, and in what type of occupancy.
- How the fire department utilized its resources to accomplish fire prevention program objectives.

The FIRS package includes eight volumes of documentation, computer programs, and test data and six days of on-site support.

This system is an efficient and cost-effective method for keeping accurate and complete records of inspected occupancies. It saves inspector time, and provides data in a form useful for operational management decision-making. As the most current and accessible data-based inventory of occupancies available, it provides information for fire protection fiscal and long-range master planning. It is a system designed for use during suppression and prevention operations and brings to the fire service, other public code enforcement agencies, and to industry the opportunity to use a process and information previously unavailable.

Fire service agencies using the Fire Inspection Reporting System include:

Alberta Fire Marshal's Office, Alberta, Canada
Greensboro Fire Department, NC
Houston Fire Department, TX
Minneapolis Fire Department, MN
San Diego Fire Department, CA
San Francisco Fire Department, CA
San Jose Fire Department, CA
Toledo Fire Department, OH
Warwick Fire Department, RI

Further information on the Fire Inspection Reporting System and its application in a community can be obtained from Carl E. Peterson, National Fire Protection Association.

Fire Station Location Package

Using the Public Technology, Inc. (PTI), Fire Station Location Package, local administrators and fire officials can evaluate the adequacy of fire station locations — both present and planned — on response time rather than distance requirements to maximize fire protection.

Utilizing a project team composed of fire officials, support staffs, and representatives of top management, the process provides a focal point for fire officials and local administrators to reach common agreement on the level of service which is to be provided in the community.

The PTI Fire Station Location Package can be used to aid decisions on the least expensive alignment of fire stations necessary to meet local fire protection requirements. The package allows a municipality to develop a configuration of stations which recognizes "response time" as the single most important ingredient in saving lives and reducing fire damages. Depending on local conditions, the alignment of fire stations may be less, more, or the same number of stations that a locality has now, but it will be based on an objective appraisal of local needs.

The package can assist a community to:

- measure the effectiveness of current deployment
- compare alternative site options
- determine effects of annexation or development
- plan for the future

The package is structured around a computer program which utilizes "response time." The package includes orientation and training sessions, documents, forms, worksheets, computer programs, and (if necessary) technical assistance. The strategic siting of fire stations is based on the inherent time requirement of any human occupancy or property for fire protection. This is defined independent of any specific station location proposal or national standard.

Local government personnel survey their community to collect data on hazards to life and property. Inherent requirements for a quick response may be dictated by the type and age of each structure, frequency of use, and other factors. Additional data are collected on possible fire station sites and characteristics of the local street system. Based on this analysis, local administrators and fire officials can specify how fast fire apparatus must respond to a fire alarm or other service call. This constraint is called the response time requirement. The computer-generated data summaries are then used to measure the consequences of alternative proposals.

However, the package does not make decisions. Careful interpretation yields a clear understanding of the options available. Decisions are made by interpreting the imbalances that occur between the "supply" of station sites and the "demand" for fire protection. Decision makers themselves select the proposal that meets local objectives for fire protection.

Additional information on this package is available from:
Public Technology, Inc.
1301 Pennsylvania Ave., NW
Washington, DC 20004
(202) 626-2400

Fire Alarm Assignment System (FAAS)

The Fire Alarm Assignment System (FAAS) is a systematic process for planning, evaluating, and constructing an emergency alarm assignment street file. A completed file contains recommendations about which fire companies should respond and which companies should be relocated in an emergency dispatch. In summary, FAAS facilitates planning and carrying out variations in fire alarm assignment that support dispatch and suppression activities. Work on FAAS was sponsored by the United States Fire Administration.

The planning consists of defining policies that are the basis of constructing the assignment file. Once policy is defined, an efficient and accurate method for testing and implementing needed policy changes is provided by FAAS.

The successful implementation of FAAS requires the use of a geocoded street file, such as the U.S. Census Bureau's DIME file, and digitization (assignment of x and y coordinates) to a map overlay of response zones. The documentation for the System guides the user through the various steps necessary, and on-site technical support is available to assist with implementation.

The System can be used in both planning and operations to determine fire department resource deployment. The System provides:

1. Improved accuracy, consistency, and accessibility of fire alarm assignment files.
2. Easy updating of fire alarm assignments as new streets are added, new fire stations built, or new areas annexed.
3. A method of timely evaluation of alternatives in dispatching policy or resource allocation.
4. A file and associated response and relocation logic, which can be used with an on-line system for computer-aided dispatching.

Reports generated by FAAS show the effect of individual station locations, including each company's associated travel time, as well as the combined results of response and relocation assignments. The final product is a street file with fire company response and relocation assignments through five alarms that could be used for manual or computer-aided dispatch. Additional information can be generated, such as the average response time to first due areas and comparisons of response times to each section of the city.

The Fire Alarm Assignment System was tested and is operational in Tacoma, Washington.

Further information on the Fire Alarm Assignment System is available from Carl E. Peterson, National Fire Protection Association.

Computer-Aided Dispatch System (CADS)

A Computer-Aided Dispatch System (CADS) is an information processing system to support dispatch operations. CADS uses information entered by operators from communication devices (telephones, alarm systems, radios, etc.) and drawn from computer files (street and other locations, assignments, and status files). This information (location and type of emergency, status changes, etc.) is used to prepare recommendations for assignment (output) to assist in dispatch decisions. The system recommendations are then accepted or modified by dispatch personnel. The final dispatch decisions regarding resource allocations are then sent over communications devices (radios, teletypes, etc.) to field units. CADS, therefore, becomes an integral part of the communication system, and increases its information-processing capabilities.

Since the early 1970s, several communities have installed computer systems to improve communications and dispatch operations. The degree to which these systems support operations ranges from basic information processing to totally interactive decision support systems. The development, design, and installation of a system is costly, requires unusual project management capabilities, takes several years to implement, and may significantly change the policy and procedures used in emergency operations.

A CADS takes advantage of computer technology to offer alternative methods of executing various tasks by adjusting constraints. The kinds of improvement in the dispatch operation that can be expected from implementation of a CADS are:

1. **Accuracy.** CADS eliminates many efforts such as repeated handling of forms, time stamping, and copying of information from one form to another. Automatic editing of invalid codes, street addresses, and unit designations assists the dispatch operator.

2. **Operator Performance.** Many tedious, repetitive clerical tasks are eliminated or simplified, allowing the dispatcher to concentrate on decision-making and communication activities, thus improving field unit support.

3. **Speed.** Many tasks are performed more quickly than under manual operations (e.g., file accessing and incident record updating), making it possible to perform some tasks not previously possible (additional data on hazards, prior or simultaneous nearby events checks) due to the size of the data base and time required. CADS can reduce the time required to receive information and to send information to field units.

4. **Span of Control.** It provides a more efficient way of maintaining the status of units and incidents.

5. **Paperwork Reduction.** The resulting data bases can be used to generate management reports that summarize activity at desired intervals (daily, monthly). The data forms the basis of an automated incident reporting system.

6. **Expansion of Capabilities.** The ability of a computer to perform many tasks without operator intervention can enhance the dispatch environment including: automatic status map and display; fire station printers or display terminals; and mobile digital terminals.

In 1978, the National Fire Protection Association (NFPA) organized a consortium of communities which contracted with NFPA to provide guidance in the project management, specification, procurement, and installation of a fire CADS.

The goals of this study were to:

1. Identify and document, through analyses of existing, operating CADS and other sources, methods and procedures that at least accommodate the needs of the participating communities and lead to successful project management, functional analysis and description, system specification, procurement and installation of a fire CADS.
2. Provide information and techniques for comparing various alternatives to CADS design.

Three documents that resulted from this study contain a guide that suggests several alternatives and the trade-offs of each selection. In some cases, actual examples are provided and the user must review, edit, or modify the presentation. In most cases, an agenda or recommended order of tasks to be executed are described. Lists of considerations and their implications are described in sufficient detail to guide the user, designer, and other technicians in installing a CADS. Copies of these three volumes are available from the NFPA, Batterymarch Park, Quincy, MA 02269, Attention: Public Fire Protection Division.

Volume I, PROJECT MANAGEMENT GUIDE, focuses mainly on the problems associated with executing a complex, technical project. Guidelines for anticipating and avoiding problems in planning, scheduling, developing and implementing a CADS are presented. A description of the role of a project manager and skills of various team members provides the framework for developing and assigning discrete tasks.

Volume II, SYSTEM DESIGN GUIDE, organizes "how to" of every task from functional analysis to final system acceptance and maintenance. Procedures required in performing a functional analysis are provided with examples of how to create objective statements, performance criteria, and breakdowns of functional requirements. A detailed functional description is provided as a model with instructions for comparing and modifying it to reflect local operations. A technique for translating this description into a system specification is presented with examples. The minimum contents of a Request for Design are described with examples or guidelines for their development. Other important concerns regarding system reliability, training, data bases, maintenance, etc. are also addressed.

Volume III, PROCUREMENT GUIDE, provides a device for communicating the procurement process to the users and computer technicians. The form and content of contracts for computer system design, hardware purchase, and software development are described for the procurement specialist. The benefits and procedures of a negotiated procurement are recommended as a method for acquiring the most desirable system at a reasonable cost.

Computers are being used in a number of communities to assist in dispatch operations. Some of these communities are:

Citrus Heights, CA
Centereach, NY
Dallas, TX
Huntington Beach, CA
Indianapolis, IN
Los Angeles, CA
Los Angeles County, CA
Memphis, TN
Minneapolis, MN
New Castle County, DE
New Orleans, LA
New York, NY
Oklahoma City, OK
Phoenix, AZ
Reno, NV
San Francisco, CA
San Jose, CA
Washington, DC

Microcomputer Use

The greatest technology advances in computers in the past few years have been in the area of the microcomputer. These systems can make computing power available to a local fire department at prices well within its financial means. Turn-key application software specifically designed for fire service application is just starting to be developed, but generalized software for building data bases, financial calculation, or word processing is readily available for most microcomputers. The Office of Fire Protection Management, United States Fire Administration, Federal Emergency Management Agency has recently prepared a paper on the "Microcomputer and the Fire Service." The paper will aid persons desiring to use microcomputers in selecting both hardware and software to best meet their needs. Copies of this paper are available from the NFPA Public Fire Protection Division. The following list is reprinted from that paper. It lists currently identified users of microcomputers and commercial applications available for microcomputers.

Arizona
Bruce Varner, Fire Captain
Phoenix Fire Dept.
1250 E. Windsor
Phoenix 85006
(602) 262-6297
TRS-80 Model I

Robert Weber, Chief
Lake Havasu City Fire Dept.
145 N. Lake Havasu Ave.
Lake Havasu City 86403
(602) 855-1141
TRS-80 Model I

Matt Mastriano, Technical Service Supervisor
Tucson Fire Dept.
265 S. Church
Tucson 85721
(602) 791-4804
TRS-80 Model II
Original Programs:
  Medical System
  Flow Information
  Inspections

California
Norma Calvi, Command Center Manager
U.S. Forest Service
San Bernadino National Forest
144 N. Mountain View
San Bernadino 92408
(714) 383-5588
FTS 793-5654
Apple II Plus
Original Programs:
  CAD, Initial Attack Dispatch
  Vendor Contracts
  Telephone Directory
  Personnel
  RESTAT
  Fire Activity Statistics

Dave Dowling, Dispatcher
San Bernadino Fire Dept.
Communications Center/Fire Dispatch
104 W. 4th St.
San Bernadino 92401
(714) 383-3707
TRS-80 Model III
Original Programs:
  Resource Status
  Emergency Resource
  Multi-Casualty Distribution

Connecticut
John Yost, Chief
Norwalk Fire Dept.
121 Connecticut Ave.
Norwalk 06854
(203) 866-3312

Florida
Charles Shipman
Lutz Volunteer Fire Dept.
Lutz 33549
(813) 949-3436
Apple II
Original Program:
  Statistical Package,
suitable for small communities

Edwin Spahn, Chief
Orange County Fire and Rescue
66 E. Center Blvd.
Orange 32801
(305) 420-4262
TRS-80 Model I

Gary Briese
803 Alfred Dr.
Orlando 32810
(305) 647-0351
Apple II

Timothy Stillman
Institution of Fire Engineers
60 Hendricks Isle
Ft. Lauderdale 33301
(305) 467-2301
TRS-80 Model I

Georgia
Lou Cuneo, Chief
Atlanta Fire Dept.
25 Claire Dr.
Atlanta 30315
Apple II Plus
Original Program:
  Personnel/Training

Illinois
Ron Dukes, Chief
Glenside Fire Dept.
1608 Bloomingdale Rd.
Glendale Heights 60137
(312) 668-5323
TRS-80 Model II
Original Programs:
  Fire Response Statistics
  Ambulance Response Statistics Records

Kansas
John Bode, Lieutenant
Wichita Fire Dept.
455 W. Main St.
Wichita 67202
(316) 268-4451
Altair 8800
Original Program:
  Physical Fitness

Leon Stitt
Department of Emergency Communications
535 N. Main
Wichita 67203
(316) 268-4329
TRS-80 Model II

Maryland
John Hess, Instructor
University of Maryland
Department of Fire Science
College Park 20742
(301) 454-2416
Original Program: (for Atari)
  Fire Simulation

Warren Isman, Chief
Montgomery County Department of Fire and Rescue Services
101 Monroe St.
Rockville 20850
(301) 251-2444
Atari 800
Original Programs:
  Catalogue & Inventory
  Training Examinations

Massachusetts
Gerald LaFlamme
Shrewsbury Fire Dept.
P.O. Box 275
Shrewsbury 01545
(617) 842-6640
Digital

Paul LaLonde, Lieutenant
Amherst Fire Dept.
69 N. Pleasant St.
Amherst 01002
(413) 253-3431

Missouri
Lloyd Monroe, Chief
Kansas City Fire Dept.
414 East 12th St.
Kansas City 64106
(816) 274-2347
274-1240
Apple II Plus

Rich Fagan
Lee's Summit Fire Dept.
207 S. Douglas St.
Lee's Summit 64063
(816) 251-2343
Motorola
Original Program:
  Computer-Aided Dispatch

Robert Lowe
Sni Valley Fire Protection District
1601 Broadway
Oak Grove 64075
TRS-80 Model 16

New Jersey
Thaddeus T. Lowden
Marlton Fire Dept.
26 East Main St.
Marlton 08053
(609) 983-2210

New York
Gary Darling
Bainbridge Fire Dept.
W. Main St.
Bainbridge 13733
(607) 729-2551
TRS-80 Model I

Robert Elling
Regional Emergency Medical Organization
22 Warehouse Row
Albany 12205
(518) 459-8251
TRS-80 Model II

Mike Semel
Elmira Volunteer Fire Dept.
421 Highland Ave.
Elmira 14905
(607) 734-0766

Matthew Shulman
Lansing Fire Dept.
80 Ridge Rd.
Lansing 14882
(607) 533-4118
Apple II

Jerry Laughlin
Fire Engineering Magazine
875 Third Ave.
New York 10022
(212) 605-9400
Apple II

North Carolina
Kathleen Loewy
6419 Teague Lane
Charlotte 28215
(704) 535-5581
TRS-80 Model II

Ohio
Bernard Conine
Fostoria Division of Fire
233 W. South St.
Fostoria 44830
(419) 435-3206

Gordon Hartschuh
Bath Fire Dept.
3864 W. Bath Rd.
Akron 44313
(216) 666-3733
TRS-80 Model III
Original Program:
  Incident Statistics

Oregon
Grant Smith, Chief
Canby Fire Dept.
230 S. Grant
Canby 97013
(503) 266-5851
Apple II Plus

Gerald Pyle, Training Officer
Tualitin Fire District
P.O. Box 127
Tualitin 97062
(503) 682-2601
Apple II Plus

Pennsylvania
Robert S. Goeltz
Hermitage Fire Dept.
2511 Highland Rd.
Hermitage 16148
(412) 342-0669
Commodore P&T, Model 2001

John L. Richey, President
Neshannock Volunteer Fire Dept.
315 Old Mercer Rd.
New Castle 16105
(412) 654-7409

S.E. Schopfer, Operations Manager
Lycoming Emergency Services
48 W. Third St.
Williamsport 17701
(717) 327-2447

South Carolina
Floyd Yocum
272 Bay Tree Lane
Myrtle Beach 29577
Apple II

Tennessee
Dr. David Icove
Knoxville Arson Task Force
Department of Public Safety
800 East Church Ave.
Knoxville 37915
(615) 521-1200
TRS-80 Model II
Original Program:
  Arson Pattern Recognition System

Ed Chapin
Chattanooga Computer Center
807 Market St.
Chattanooga 37402
(615) 756-3233
Apple II
Original Programs:
  Rescue
  EMS
  Fire Training
  Fire Simulation

Texas

Ed Hawk, System Coordinator
Houston Fire Dept.
333 Preston
Houston 77002
(713) 222-4631
TRS-80 Model III

Bobby C. Moore, Deputy Chief
Dallas Fire Dept.
2014 Main St.
Dallas 75201
(214) 670-4311
Apple II

Virginia

Timothy Butters
Burke Volunteer Fire Dept.
9501 Burke Lake Rd.
Burke 22105
(202) 287-0795
TRS-80 Model II
Original Programs:
  Master Planning
  Hazardous Materials
These programs are available through FEMA.

Jim Hicks, Assistant Chief
Alexandria Fire Dept.
900 2nd St.
Alexandria 22314
(703) 838-4600
Dyna-Byte

Kenneth Lavoie, Chief
Hampton Fire Dept.
Hampton 23669
(804) 727-6580
IBM Display Writer

Bruce Roemmelt, Major
EMS Training Coordinator
Prince William County Fire and Rescue Service
9300 Lee Ave.
Manassas 22110
(703) 369-9300
TRS-80 Model II

Joseph Saitta
EMS Management Institute
107 East Holly Ave., Suite 12
Sterling 22170
(703) 450-6097
Apple II Plus

Washington

R. O. Duncan, Chief
Bothell Fire Dept.
10726 Beardslee Blvd.
Bothell 98011
(206) 468-1678
Apple II
Original Programs:
  WFIRS Reporting
  Fire Flow Calculations
  Flow Testing Calculations
  Data Base Inventory
  Hydrant Testing Records
  Hose Testing
  Fire Investigation

Ron Klimmel
Washington Fire Service Training
Airdustrial Park Blvd.
17LS10
Olympia 98504
(206) 753-5679
Apple II Plus

Les Flue, Chief
Parkland Fire Dept.
100 S. 114th St.
Tacoma 98444
(206) 537-8530
Apple II

Philip Lund
Thurston County Medic One
413 Lilly Rd.
Olympia 98506
(206) 753-8246
Apple II
Original Program:
  Medical Reporting

Robert Hays
Bellevue Fire Dept.
666 Bellevue Way, SE
Bellevue 98004
(206) 455-6982
Apple II

Joe Parrott
Lacey Fire Dept.
P.O. Box 3366
Lacey 98503
(206) 491-2410
Apple II
Original Program:
  Training

Wyoming
Randy Vickers, EMS Director
Laramie Fire Dept.
P.O. Box C
Laramie 82070
(307) 721-5232
TRS-80 Model II
Original Program:
  Fire Simulation

Microcomputer Training Courses

California
Ted Gold, Fire Service Coordinator
Indian Valley College
Ignacio Blvd.
Novato 94947
(415) 883-2211

Maryland
Michael Fay, Faculty Member
National Fire Academy
16825 S. Seton Ave.
Emmitsburg 21727
(301) 447-9600
(800) 638-9600

Ohio
Robert Taylor, Operations Supervisor
Ohio Fire Academy
8895 East Main St.
Reynoldsburg 43068
(614) 864-5510

Commercially Available Programs

California
Robert J. Bernard
Franklin Computer Systems, Inc.
715 Fremont Ave.
South Pasadena 91030
Available Programs for Dec PDP 11 16 Bit Micro:
  EMS Programs
  Billing
  Activity Analysis
  Paramedic Procedures
  Certificates & Licenses
  Vehicle Maintenance

Colorado
Clifford Harvey, President
FireMeasure, Inc.
1090 Edinboro Dr.
Boulder 80303
(303) 494-6320
Applesoft Programs:
  Building Fire Safety
  Assessments
  Code Violations

Illinois
Robert Kula
Comprehensive Systems, Inc.
142 Hawley St.
Grayslake 60030
(312) 223-2811
Available Programs:
  NFIRS 902 F & G
  Emergency Systems
  Pre-Fire Planning
  Inventory
  Personnel & Training

Michigan
Robert Tidmore
Marmen Computing
125 6th Ave.
Menominee 49858
(906) 863-2611

New York
Tom Van Destowe
Binary Technology Enterprises, Inc.
171 Hawkins Rd.
Centereach 11720
(516) 981-8568
(516) 588-5836 MODEM Line
Available Program:
  EMS Package for TRS-80 I & III

Oregon
Mary Pyle
Fire Service Training Programs
P.O. Box 22405
Milwaukee 97222
(503) 659-9030
Programs Available:
  Applesoft Programs
  Fire and Life Safety for Elementary Schoolers

Pennsylvania
John Armstrong, President
Customized Business Control, Inc.
2827 Truman Dr.

Hatfield 19440
(215) 362-2123
Available Programs:
- Fire Reports
- Personnel
- Scheduling
- Inventory Management

Texas
Nathan R. Gehman
Fire Service Consultants
1520 N. Frazier
Suite 191
Conroe 77301
(713) 756-1411

The National Interagency Incident Management System

Source: Forest Service, U.S. Department of Agriculture

The National Interagency Incident Management System (NIIMS) was designed by a group of local, state, and federal agencies, responsible for fire protection in order to help improve the ability of fire protection forces to respond to any type of emergency. While NIIMS is a new system, it includes the best features of two existing fire suppression management systems currently in use in the U.S. NIIMS includes interactive subsystems that help to make a comprehensive emergency management system.

Although NIIMS was developed by fire protection agencies, the same management concept can be used to respond to public emergencies of any type. Using the principles outlined in NIIMS, national disasters such as floods, hurricanes, and earthquakes, and local situations in which several jurisdictions are involved, such as tornadoes, major aircraft accidents, and hazardous material spills all can be managed more efficiently.

The National Interagency Incident Management System consists of five major subsystems which collectively provide a total system approach to all risk incident management.

Following are brief descriptions of the subsystems:

- The on-scene management structure is called the Incident Command System. This system includes operating requirements and interactive components for organizing and operating the system.
- Standardized training supports the effective operation of NIIMS.
- A recommended Qualification and Certification subsystem provides personnel meeting standard training, experience, and physical requirements to fill specific positions within the Incident Command System.
- A Publications Management subsystem includes development, publication, and distribution of NIIMS materials.
- Other supporting technologies such as Orthophoto Mapping, Infrared Imagery, Multiagency Coordination, or a Decision-Making Process can support NIIMS.

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*NWCC was chartered in 1972. Its function and purpose is to establish an operational group designed to coordinate fire management programs of the various participating agencies; to avoid unnecessary duplication; to provide a means for the participating agencies to constructively work together; and to facilitate a "total mobility" concept. Its goal is to provide more effective execution of each agency's fire management program. Membership of NWCC consists of officials from each of the following agencies:
Bureau of Indian Affairs
Bureau of Land Management
National Park Service
Fish and Wildlife Service
National Association of State Foresters
Forest Service
A representative from the Federal Emergency Management Agency also participates.

Each of the subsystems of NIIMS must be interactive. Each supports the other. This is the strength of NIIMS.

The federal wildland fire protection agencies and some state forestry agencies have for many years operated under the Large Fire Organization (LFO). This organization, when coupled with the National Interagency Fire Qualification System (NFIQS) developed by the National Wildfire Coordinating Group (NWCG)* is a complete fire management system. However, the terminology and the organizational structure are barriers to coordination with fire departments and other emergency services. In addition, the qualification and certification system (NIFQS) caused difficulty in integrating state and local forces in suppression efforts.

The fire services in southern California have operated for several years under the Incident Command System (ICS). The ICS, which was developed by those partner agencies, provides a common emergency management structure for the agencies which must work together in a crisis. It is another proven organization; however, it lacks a qualification and certification system, and thus, it is incomplete.

By 1980, NWCG realized that two parallel systems were being developed. They commissioned a study to: (1) analyze fire suppression systems developed and in use, and (2) pull together the better parts of those systems into a single system that would have national acceptance. The National Interagency Incident Management System is the result of that effort.

The adoption and implementation of NIIMS are proceeding faster than anticipated. It is truly an interagency effort with full NWCG support. The federal agencies that have adopted NIIMS include the Forest Service, National Park Service, and Bureau of Indian Affairs. The Bureau of Land Management is analyzing the system and is expected to make a decision later this year (1982). The Fish and Wildlife Service will adopt it on a refuge-by-refuge basis to coordinate with their neighboring agencies.

There are twelve states that have expressed an interest in adopting NIIMS in the near future. Three of these — California, Colorado, and Florida — have implementation plans in progress. Others are planning implementation within the next few years. Most of these states plan to implement the system with all emergency services included.

The concepts associated with NIIMS are not new, but are a refinement of what is already being done. However, NIIMS offers a flexibility which provides many advantages over existing systems, such as the ability for local emergency services to respond jointly in a more effective and efficient manner. With the adoption of NIIMS by emergency service agencies, cooperative association previously unknown will evolve.

Estimation of Dollar Losses Due to Fire

Adequate reports of estimated fire losses are important in the fire data collection process at the local, state, and national levels. They provide a measurable basis for recording the severity of a loss, and the mechanism through which degrees of damage to similarly constructed buildings can be measured and compared.

Property loss is generally regarded as the cost to replace real property (structures) and personal property (contents), damaged or destroyed. In most cases, the estimated value of loss should be based on the current cost to rebuild the structure or replace the contents using the commonly accepted insurance definition: "...with material of like kind and quality within a reasonable period of time after such loss....."[1] In cases where there is partial fire, smoke, or water damage (i.e., damage confined to the object or area of origin of the fire, or any damage less than total), the approximate estimate should be based on the extent of damage observed at the site of the loss.

Market value estimates are not a valid method of establishing fire loss for real property. Market value is generally based on an agreed price for transfer of property between a willing buyer and a willing seller, each under no duress. This value usually has no direct relationship to construction or replacement costs. It typically incorporates the value of land with the value of the structure. It is also a function of the trend of the economy at the time of the sale and what the market will bear.

There are several methods for determining property loss values. Published guides are available which present the methods (see Reference list which follows this article). The values presented here represent the cost to reconstruct a typical single-family wood frame dwelling as it existed before the fire, including the costs of materials, labor, and other contractors' cost factors. The values are based on costs in the Boston area, but should be typical for most large metropolitan areas. The costs may be adjusted for individual localities with factors supplied by the sources mentioned in the Reference list. An alternative to this method would be for the local fire department to prepare similar tables for the immediate area covered, with the assistance and cooperation of local contractors and merchants. Municipal building departments will also have a knowledge of local construction costs.

Estimating Structural Loss in Single-Family Dwellings

The values tabulated below correspond with four grades or classes of dwelling construction as described in Robert S. Means' *Residential Cost Data — 1982*.[2] Determination will need to be made as to the original quality of the workmanship of the dwelling: Economy, Average, Custom-Built, or Luxury. For the purpose of this discussion, the following are presented as general definitions of the building classes common to *residential* construction.

Economy Class: An economy class residence is usually mass-produced from stock plans. The materials and workmanship are sufficient only to satisfy minimum building codes. Low construction cost is more important than distinctive features. Design is seldom other than square or rectangular.

Average Class: An average class residence is simple in design and is built from standard designer plans. Materials and workmanship are average, but often exceed the minimum building codes. There are frequently special features that give the residence some distinctive characteristics.

Custom Class: A custom class residence is usually built from a designer's plans which have been modified to give the building a distinction of design. Material and workmanship are generally above average with obvious attention given to construction details. Construction normally exceeds building code requirements.

Luxury Class: A luxury class residence is built from an architect's plan for a specific owner. It is unique in design and workmanship. There are many special features, and construction usually exceeds all building codes. It is obvious that primary attention is placed on the owner's comfort and pleasure. Construction is supervised by an architect.

The following table may be used as a guide for quick estimates of loss for typical single-family wood frame dwellings. It is stated in 1982 dollars per square foot and is based on the total square footage of living area only. The living area is a sum of all the levels of functional living space (ceiling height of six feet or more) expressed in square feet. Values for roofs, attics, and basements have been distributed proportionately throughout the living area. The averages presented will fit most situations, except the very extreme at each end of the scale. Loss to other buildings on the property such as garden sheds, detached garages, etc., must be estimated separately based on size and information available locally.

Table 1
TYPICAL RESIDENTIAL CONSTRUCTION COSTS — 1982 *
SINGLE-FAMILY WOOD FRAME DWELLINGS; DOLLARS PER SQUARE FOOT OF LIVING AREA **

	Levels of Living Area				
Class of Construction	One Story	One-and-a-Half-Story (Finished Second Floor)	Two-Story	Bi-Level	Tri-Level
Economy	$32.30	$24.00	$28.85	$24.20	$23.00
Average	33.90	29.65	29.50	27.60	26.75
Custom	39.40	32.70	33.45	32.75	32.45
Luxury	50.35	45.90	45.95	42.20	40.10

*Source R. S. Means, *Residential Cost Data-1982*, 1st Annual Ed., Robert Snow Means Co., Inc., Kingston, MA, 1982, pp 184-203

**Values for roofs, attics, and basements have been distributed throughout the living area

In estimating a dwelling loss less than 100 percent, the percent of loss can be expressed as the ratio of fire damaged area to the total square footage of the dwelling.

EXAMPLE: The second floor of a one-and-a-half-story average class dwelling is totally destroyed by fire. The total living area of the dwelling is 1,800 square feet. The loss is estimated to be one third of the total living area. A detached one-car garage is also destroyed.

From Table 1, the estimated structure loss for the dwelling may be determined as follows:

average class one-and-a-half-story dwelling @ $29.65/SF
second floor living area ⅓ × 1800 SF = 600 SF
Estimated structure loss = $29.65/SF X 600 SF
to dwelling
= $17,790, say $18,000.

Additionally, the one-car detached garage was totally destroyed. An on-site approximation of loss based on size and typical construction costs for a wood frame detached garage was estimated at $6,000.

The total estimated structure loss at the property would be:

TOTAL ESTIMATED STRUCTURE LOSS = DWELLING LOSS + ADDITIONAL STRUCTURE LOSS (Garage)
= $18,000 + $6000
= $24,000.

The values in the table are reasonable estimates for most metropolitan areas. Where it is known that unusual labor or material supply problems exist, the values may be increased slightly to a maximum of plus 5 percent. In southern states, these values may be decreased slightly to a maximum of minus 10 percent, with a total of minus 15 percent being applicable in very rural southern areas. The values in the table are valid only for 1982. Local real estate personnel, municipal building departments, insurance agents, or contractors will usually be able to provide the percentage increases to be applied to the values for succeeding years for their respective areas. Also, published estimating guides list the locality adjustment factors by metropolitan area according to postal zip codes.

Table 2
TYPICAL VALUES OF FURNISHED ROOMS — 1982 DOLLAR ESTIMATES

Class of Construction	Type of Room						
	Living Room	Dining Room	Kitchen	Bedroom (Each)	Full Bath (Each)	Den	Family Room
Economy	$ 4,500	$ 3,500	$ 4,000	$3,000	$3,000	—	—
Average	7,500	5,000	6,000	4,000	3,500	—	$4,000
Custom	10,000	7,500	8,000	5,000	4,000	$ 6,000	5,000
Luxury	15,000+	10,000+	10,000+	7,500+	5,000+	10,000+	7,500+

Notes:

For combination rooms, use a percentage of each type of room receiving the damage. For example — an eat-in kitchen value could be approximated by ⅔ kitchen value + ⅓ dining room value.

Percentages should be adjusted to each individual situation at the discretion of the reporting individual.

Estimating Contents Loss in Single-Family Dwellings

Structural loss is only part of the loss picture. It is also necessary to estimate the value for loss to contents. This task is not as straightforward as estimating structural loss, but generally it represents a smaller number.

For reporting purposes, if an accurate estimate of contents loss cannot be made by the owner or some other appraiser, a "ballpark" estimate of loss may be made by estimating the loss on a room-by-room basis. The table presented below has been prepared to provide rough estimates of the loss for typical rooms in single-family dwellings. The values are approximate for basic room furnishings and should serve only as a guide to reasonable values of furnishings. Items incorporated into these values include the costs of furniture, kitchen appliances, televisions, radios, drapes, lamps, dishes, tableware, clothing, and other items essential to a typical functioning household.

The values in the table were based on 1982 observations of contents in dwellings of each building class using generally accepted insurance appraisal techniques. When no specific information is available to the reporting official as to the nature of contents destroyed, the contents value may be approximated between 30-50 percent or more of the structure value. (Insurers typically allow a value of personal property at 50 percent of real property value.) However, this technique should only be used as a last resort in estimating loss to furnishings and other contents. There will always be discussions regarding the values of personal property destroyed in a fire, but for reporting purposes, these estimates will suffice.

EXAMPLE: In the previous structural loss estimate example, where the second floor of a one-and-a-half-story average class dwelling was damaged by fire, the following rooms were destroyed; two bedrooms and a full bath.

From Table 2, the estimated contents loss for the dwelling may be determined as follows:

2 bedrooms @ $4,000 each	= $8,000
1 full bath @ $3,500	= $3,500
Estimated Contents Loss	= $11,500*

*This estimate does not take into account depreciation in the value of contents.

TOTAL ESTIMATED DWELLING LOSS = TOTAL ESTIMATED STRUCTURE LOSS +
ESTIMATED CONTENTS LOSS
=$24,000 + $11,500
=$35,500.

In round numbers, the estimated loss to the dwelling would be $35,000. These values are strictly estimates to be used when approximating fire losses from notes taken at the site of the fire. They should be applied with discretion and modified as necessary by the reporting individual based on the actual observations of the property damage noted at the fire scene.

In addition to this total, allowance must generally be made for smoke, water, and fire control damage based on observations made at the fire scene.

There are more experienced and qualified individuals, such as appraisers and adjusters, who are trained in their respective professions to properly determine property values and to make appropriate settlements of loss. Due to their training and expertise, these individuals can determine the value for the insured loss; they should be contacted when a more accurate value of the loss is necessary.

With notes taken at the site and simple tables to assist in determining the value of the loss, losses to single-family wood frame dwellings can be estimated easily and with confidence. For analytical purposes, the values derived in this manner will have more significance than verbal generalizations of damage, such as "slight," "moderate" or "heavy." Resulting dollar estimates will enable fire loss associated with fire spread to be analyzed.

Industrial and Commercial Property Loss Appraisal

Industrial and commercial property evaluations are much more involved and the values represented are in general significantly higher than residential values. Estimating procedures similar to those presented here for dwellings may be used, although it will be necessary to go to commercial estimating guides to get reasonable approximations for the values involved for contents as well as for industrial or commercial type building construction (see Reference list at the end of this article).

Salvage should be considered when estimating partial losses. It is the responsibility of the insurance adjuster to adequately determine the amount of salvage for any loss; the methods are varied and depend on the wording of the insurance policy.

In addition to direct property losses from fire already discussed, there are losses of an indirect nature. Indirect costs of fire losses extend beyond lives lost, injuries, and property damage. Especially for commercial and industrial situations, substantial economic losses occur which impact both businesses and the communities they serve. The following two lists[3] present types of indirect losses.

Losses to the Fire-damaged Business

Business interruption as a result of a fire may have one or more of the following effects:

1. Loss of customers.
2. Loss of return on capital investment.
3. Loss of profits on finished goods.
4. Loss of investors' confidence.
5. Loss of credit standing.
6. Loss of goodwill of customers, employees, and the community.
7. Loss of trained personnel who transfer to other jobs.
8. Cost of retaining key personnel during shutdown.
9. Loss of productive services of key personnel retained during enforced shutdown.
10. Seizure of fire insurance payments by uneasy creditors.
11. Excessive replacement costs due to overtime, inability to buy at time most advantageous to buyer, etc.

12. Cost of demolition.
13. Cost of replacing depreciated buildings and equipment with new facilities.
14. Continuance of fixed charges during shutdown.
15. Cost of hiring temporary quarters.
16. Loss of valuable records, EDP storage, one of a kind molds, and other items that cannot be replaced or can be replaced only at a great cost.
17. Loss of earning power of patents, trademarks, etc.
18. Loss of value of past advertising.
19. Inability to defend against unjust claims due to loss of records.
20. Loss of rent from tenants.

Losses to the Community

The business itself and the employees involved are not the only "losers" in the event of a fire. The whole community also suffers in the following ways:

1. Loss of circulation of employees' payroll.
2. Increased burden on welfare and unemployment compensation funds.
3. Loss of business by suppliers of raw materials and services to fire-damaged plant.
4. Loss of labor market.
5. Loss of taxes on destroyed property.

For fire-damaged businesses, the economic impact of indirect losses manifests itself in many ways, as the lists enumerate. The losses disturb the consumer base which provided the lifeblood of cash flow for the business and retard the opportunity for a speedy recovery from the fire. With such interruptions to the normal course of business, consumers find other suppliers with goods and services more readily available. This, in turn, slows the recovery even more. When the business re-opens, the consumer base is not automatically restored and the lost market share may never be recovered. These types of indirect losses can certainly hinder a financially weakened business that does not carry adequate insurance to relieve some of the fire loss burden.

The community suffers both economic and emotional losses. Displaced workers who cannot find replacement jobs may decide to move to another area of the country with better employment opportunities. Shrinking community size places additional burdens on the remaining population.

It is easy to see that indirect losses have far-reaching repercussions and some of these losses do not become evident until years after their occurrence. This fact, together with the uncertainty and fluctuation of the economy, makes the estimation of indirect losses very difficult to assess in terms of fixed dollar amounts. For these reasons, the values of indirect losses are generally excluded from discussions of fire loss estimating. The evaluation of these losses is left to the appropriate experts in the field of insurance and economics. Such indirect losses require thorough analysis on a case by case basis.

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[3] McKinnon, G. P., ed., *Fire Protection Handbook*, 15th Edition, Quincy, MA: National Fire Protection Association, 1981, p. 2-30.

Additional Reading

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Key Fire Departments to Contact for Networking

Fire Departments with Modern Training Facilities

Alexandria, VA
Charlotte, NC
Montgomery County, MD
Oklahoma City, OK
Virginia Beach, VA

Fire Departments Using Fire Simulators for Training

Alexandria, VA
Fairfax City, VA
Hampton, VA
Joint Powers, Huntington Beach, CA
Montgomery County, MD
Phoenix, AZ
San Diego, CA
Virginia Beach, VA

Fire Protection Master Plans Completed

Ft. Collins, CO
Metro-Dade County, FL
San Clemente, CA
Springdale, AR
Springfield, IL

Physical Fitness Programs

Alexandria, VA
Durham-University of New Hampshire, NH
Los Angeles City, CA
Phoenix, AZ

Self-Contained Breathing Apparatus Programs

Fairfax City, VA
Harrisonburg, VA
New York City, NY
Phoenix, AZ

Written Fire Operations Procedures

Los Angeles City, CA
New York City, NY
Phoenix, AZ

People to Contact at NFPA with Fire Service-Related Questions

Fire fighter qualifications Fire Prevention Code Rural fire protection	*Robert C. Barr*, Division Director Public Protection Division
Arson investigation Fire inspector and fire investigator qualifications Fire investigation Investigation of fires of electrical origin	*Robert E. Carter*
Fire service instructor qualifications Fire service officer qualifications Fire service training Forest fire service Liaison with other fire service training organizations and advisory services	*James V. McKiernan*
Fire department organization Fire protection educators accreditation Fire reporting Firesafety symbols Fire service management systems, including UFIRS and FIRS systems	*Carl E. Peterson*
Liaison with fire service organizations and government agencies	*Joseph M. Redden* Ass't. Vice President Government Affairs
Aviation fire protection (aircraft fueling and maintenance, aircraft rescue, and fire fighting airport facilities) Fire department equipment and apparatus Fire department, fireground operations Occupational safety and health in the fire service Protective equipment for fire fighters	*Bruce W. Teele*

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Guidelines for Conducting Fire Department Funerals

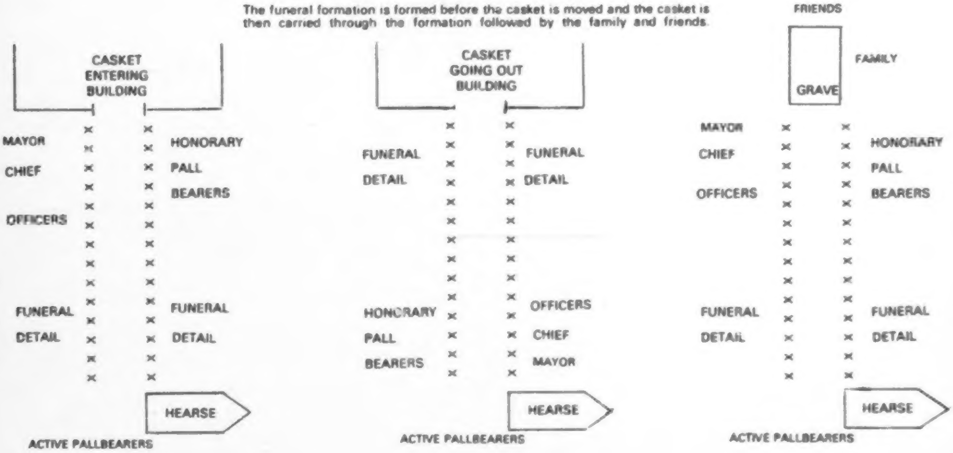
Compiled by the Lancaster, PA Bureau of Fire and printed in the January 1983 issue of ***The Pennsylvania Fireman***. Reprinted with permission.

The Guidelines in this section were compiled by the Officers of the Lancaster Bureau of Fire in 1977 and were based on their observance and experience as well as on a *Handbook on Military Etiquette*, a guideline used by the Philadelphia Fire Department, and the assistance of a local Funeral Director. These Guidelines are offered to assist other fire departments who may wish to honor a fallen comrade. The order of service was provided by the Cumberland County Firemen's Association.

GUIDELINES FOR FUNERAL FORMATIONS

(According to Military Etiquette)

The funeral formation is formed before the casket is moved and the casket is then carried through the formation followed by the family and friends.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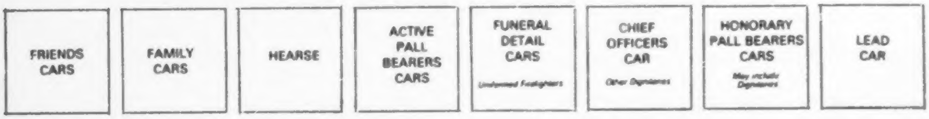
CHIEF
OFFICERS
HONORARY PALL BEARERS
FUNERAL DETAIL
FUNERAL DETAIL
HEARSE
ACTIVE PALLBEARERS
CASKET GOING OUT BUILDING
FUNERAL DETAIL
FUNERAL DETAIL
HONORARY PALL BEARERS
OFFICERS
CHIEF
MAYOR
HEARSE
ACTIVE PALLBEARERS
FRIENDS
FAMILY
GRAVE
MAYOR
CHIEF
OFFICERS
HONORARY PALL BEARERS
FUNERAL DETAIL
FUNERAL DETAIL
HEARSE
ACTIVE PALLBEARERS

Honorary Pallbears may be members of the fallen firefighter's company or station.
National and State Fire Officials may be placed with Chief Officers and/or as Honorary Pallbearers.
The Funeral Detail consists of all uniformed members of the Department and uniformed visiting firefighters.


FRIENDS CARS
FAMILY CARS
HEARSE
ACTIVE PALL BEARERS CARS
FUNERAL DETAIL CARS
Uniformed Firefighters
CHIEF OFFICERS CAR
Other Dignitaries
HONORARY PALL BEARERS CARS
May include Dignitaries
LEAD CAR

Responsibilities of Notification

A. Death in the Line of Duty

1. Upon the death of a member in the line of duty the Officer in charge, if other than Chief, shall immediately notify the Chief of the Department.
2. The Chief or his Designated Representative (DR) shall notify the next of kin.
3. The Chief or his DR shall notify the Mayor or Township Official.
4. Within a reasonable time after the death of a member in the line of duty and at a time when all companies are in quarters, the Chief or his DR shall instruct the dispatcher

to transmit the following message (This applies if the department has more than one station or announcement is to be made to all departments on a central dispatching system.):

a. "Attention all companies, stand by to receive an announcement from the Chief."
b. Upon receipt of such an announcement the man on watch will, if the company is not in roll call formation, cause the company to assemble in formation.
c. The Chief or his DR will transmit a message prepared and approved by the Chief, similar to the following:
"It is with deep regret that the Chief announces the death of (Rank, Name, Company) who lost his life in the line of duty while participating in operations on Fire Call (Number, Location, Date and Time)."
d. Upon receipt of this message the man on watch shall record the same in the company's log book.
e. Upon receipt of a notice of a member killed in the line of duty the station flag shall be placed at half staff and the front of the station shall be draped with black bunting until seven days after the funeral.

5. A news conference or a formal news release should be arranged as soon as possible so that factual information is available for dissemination.
6. The Chief shall designate an Officer-In-Charge (OIC) who shall be responsible for the department's involvement in the funeral procedures.

B. Death Other Than in the Line of Duty
1. When the Chief learns of the death of an active or retired member, he or his DR will instruct the dispatcher to notify the companies of the death in the following manner:
"It is with deep regret that the Chief announces the death of (Rank, Retiree Name, on/at Time/Date)"
2. Upon receipt of such official notification from the dispatcher of the death of a member or retiree, the station flag shall be lowered to half staff until the day following the funeral.
3. As soon as it is convenient, the Chief or his DR shall notify the Mayor's office or Township Officer of the reported death.
4. The Chief shall designate an Officer-In-Charge (OIC) who shall be responsible for the Bureau's involvement in the funeral procedures.
NOTE: Some cities have adopted the policy that flags on city buildings other than on fire stations not be lowered to half staff for retirees, only for active employees.

Responsibilities of the Officer in Charge (OIC)

A. The OIC shall contact the family of the deceased member and, in coordination with the funeral director, establish the family's desires as to fire department participation in the funeral. He shall assist the family in any way. He shall offer the fire department's services for the following situations:
1. A formal funeral, at home, funeral home, church, or cemetery; involving use of pumper, active pallbearers, honorary pallbearers, and Funeral Detail, color guard, and bugler. (This type of honor shall be reserved for those members killed in the line of duty.)
2. A semi-formal funeral at home, funeral home, church, or cemetery involving active pallbearers, honorary pallbearers, honor guard, and Funeral Detail.
3. A non-formal funeral, at home, funeral home, church, or cemetery; there being no fire department involvement, other than members attending in a passive role either at the viewing and/or funeral service.

4. Private funeral, at home, funeral home, church, or cemetery; respecting the family's wishes to have no outside participation at the funeral.
   NOTE: With the exception of those honors reserved for members killed in the line of duty, any or all of the fire department's honors may be part of a member's funeral ceremony. The desires of the family shall be paramount and shall be given the fullest respect.

B. Having established the wishes of the deceased, the OIC shall carry out any or all of the following in order to realize these wishes. The OIC shall continually be in communication with the Funeral Director as he arranges for the fire department's participation.

1. Customary Funeral Arrangements.
   - a. Arrange for an Honor Guard to stand duty during the viewing, minimum of four.
   - b. Arrange for Active Pallbearers; six plus an officer. Arrange for necessary equipment.
   - c. Arrange for Honorary Pallbearers. (Family, Company Officers, Retirees, etc.)
   - d. Arrange for Funeral Detail. (All uniformed members in attendance.)
   - e. Arrange for Bugler.
   - f. Arrange for Color Guard.
   - g. Obtain American flag for casket. (Funeral Director secures flag for veterans only.)
   - h. Provide all members of the fire department with the information necessary to carry out their roles in the funeral.
   - i. Survey the area of the funeral services and make provisions for placement of all attending units and provide information for map preparation.
   - j. Designate an area of assembly for all attending chief officers and dignitaries (preferably in a building, funeral home, church, school, or fire station.)
   - k. Designate an area of assembly for all other members of the department and visiting fire fighters.
     NOTE: This area should be a block or two away from the funeral home or church, preferably at a fire station, school, or park where ample parking and assembly area are available. This group will then march as a unit to the church or funeral home to act as Funeral Detail.
   - l. Obtain sufficient rolls of black plastic tape along with small round tipped scissors that can be carried in a pocket and make them available in the assembly areas for all uniformed personnel to place a horizontal black band over the breast badge of all participating officers and men.
   - m. The OIC or his delegated representative will coordinate all commands during the movement of the casket as prescribed in this directive.

2. Special Arrangements for Formal Funeral.
   - a. A fire department pumper(s) designated by the Chief will be appropriately prepared with flowers and black bunting and stripped of hose for use to transport the casket.
     NOTE: In case of multiple joint funeral, vans or station wagons could be substituted for pumpers.
   - b. Arrange for the proper placement of all vehicles that will participate in the funeral procession.
     NOTE: If a joint service is held and interment will be at two or more locations, separate processions must be established according to guest preference.
   - c. A map of the areas involved will be prepared to expedite the proceedings and assist out-of-town guests. Map should include:
     1. Location of fire department(s)

    2. Location of funeral homes
    3. Location of church
    4. Location of chief officer and dignitary assembly area
    5. Location of fire fighters' assembly area
    6. Location of auxiliary parking areas
    7. Location of hotel(s) for out-of-town guests
    8. Location of vehicles for funeral procession
    9. Route of funeral procession
    10. Location of cemetary and grave in cemetary
    11. Location of auxiliary parking at cemetary
    12. Location of food service areas
    13. Separate map or coding on a single map should designate location of multiple funerals and/or processions as required.
    14. Any other information deemed necessary
  d. On the map or on a separate sheet, a copy of a diagram should show the proper arrangement and movement of personnel for various ceremonies and locations as necessary.
  e. Arrangements for reproduction of sufficient quantities of the two maps and firm commitment on delivery should be established.
  f. The OIC or his designated representative will coordinate all commands during the movement of the casket and personnel.
  g. Proper arrangement with the police department should be made to handle traffic and parking at the various locations involved and along the funeral procession route.

3. Photography Coverage
   Fire department photographer or private photographer should be assigned to cover the funeral.

4. Media Arrangements
   Establish guidelines for radio, television, and press
   1. At the church inside and/or outside
   2. Funeral home inside and/or outside
   3. Cemetary: general photo coverage and/or coverage of the immediate grave

5. Arrangements for Out-of-Town Guests
   a. Transportation
      1. Airports
      2. Hotel, motels
      3. Funeral services
      4. Cemetary
      5. Food service areas
         NOTE: Where there are insufficient fire department cars, consider use of other municipal cars, surplus police vehicles, and private vehicles of department members. Provide signs for these vehicles approximately 1 1/2 feet long by 6 inches to read "FIRE DEPARTMENT COURTESY CAR."
   b. Arrange for housing as necessary for overnight guests
   c. Arrange for food service areas
      1. Chief officers and dignitaries
      2. Fire fighters
         NOTE: Food service may be needed between morning and afternoon funeral services or following a funeral service at one or more locations. Consider help from the fire department Ladies Auxiliary or Auxiliary of mutual aid companies or caterer.

Depending on the cause and number of personnel involved in a fire or emergency-related fatal accident, the number of out-of-town guests could range from a few hundred to several thousand.

Responsibilities of Members

A. All members will at all times maintain a clean, pressed, and properly fitted uniform for use at funerals and/or any other formal functions (if a department has uniforms).

B. All off-duty members and those on-duty members, upon proper relief from normal duty, should make every effort to honor their fellow members by attending the funeral services.

C. All members of the fire department shall acquaint themselves with the prescribed courtesies of the fire department's funeral procedures as outlined in this operation guide.

D. Honor Guard
   1. At least four Honor Guards are required.
   2. One member of the Honor Guard shall be designated as the Officer of the Guard (OG). He shall be responsible for obtaining the necessary equipment (white gloves, black badge bands, etc.), and for the scheduling of the Honor Guard members.
   3. Two Honor Guards, one for the head and one for the foot of the casket, shall be scheduled at ten-minute intervals.
   4. Honor Guards' uniforms shall be dress uniform or dark suits, white gloves, and black badge bands.
   5. Honor Guards shall stand at attention at their assigned positions for the duration of their ten-minute tour of duty.
   6. Honor Guard may be used during viewings and prior to the service as custom dictates.

E. Honorary Pallbearers
   1. Men designated as Honorary Pallbearers, usually retirees or members of the deceased's company, shall at all times move ahead of the casket as it is moved.
   2. The Honorary Pallbearers shall sit on the designated side of the church during the service.
   3. Dress for Honorary Pallbearers:
      a. Retirees will normally wear civilian clothes.
      b. Active members shall be in dress uniform, if department has them.

F. Active Pallbearers
   1. The Active Pallbearer Detail shall consist of six pallbearers plus an officer.
   2. The officer of the detail shall contact the funeral director for detailed instructions.
   3. The pallbearers will remain covered at all times while acting in that capacity and will wear white gloves.
   4. The pallbearers will not salute while acting in that capacity.
   5. The flag shall be placed over the casket with the blue field at the head over the deceased's left shoulder.
   6. If the casket arrives at the church from the funeral home, the Pallbearer Detail shall position themselves to receive the casket in front of the church (see diagram).
   7. During the service the pallbearer detail will sit on designated side of the church with the funeral detail.
   8. At the cemetary, after placing the casket over the grave site and upon the

officer's command, the detail shall raise the flag to waist high over the casket and hold it there during the committal service. After the committal service is read, taps may be sounded. The flag is then folded, upon the officer's command, in the prescribed military manner and presented to the next of kin by the officer of the Detail.

9. The Detail, on orders of the officer, shall take a place with the funeral detail.
10. During the graveside service, where the flag is not draped over the casket, the Pallbearer Detail, after placing the casket over the grave site, on orders of the officer shall step back with the funeral detail and follow the procedures for the funeral detail.

G. Funeral Detail

1. All members of the department, not otherwise detailed, will act as the Funeral Detail, in dress uniform, no gloves required.
2. The Funeral Detail will arrive as a group from the staging area prior to the arrival of the funeral coach at the church and take a position in front of the church on the right-hand side as indicated on the diagram.
3. For formal and semi-formal funerals, the Funeral Detail will take a position in front of the church in two facing ranks with senior officer closest to the church.
4. As the Active Pallbearers move the casket from the coach, the Funeral Detail will be called to attention by the OIC. If the casket is draped with the flag the OIC will order a hand salute as the casket passes. The command shall be "Present arms!" The command to end the salute shall be "Order arms!"
5. After the casket passes, the OIC will order "At ease" and the Funeral Detail will file into the church according to rank and sit in the designated area of the church. Head covering is removed upon entering the church.
6. After the service the Funeral Detail, on order of the OIC, will file out of the church and, in the case of a formal funeral, take a position on the right of the entry as indicated on the diagram.
7. If semi-formal service, the Funeral Detail will form facing ranks on both sides of the entry with senior officers closest to hearse.
8. As the flag-draped casket is brought out of the church, the detail is brought to attention and a hand salute is executed on order of the OIC. If no flag covers casket, ranks stand at attention.
9. The Funeral Detail rides as a group in designated cars to the cemetary or between the funeral home and church.
10. The Funeral Detail at the cemetary again forms two ranks according to rank from the location of the hearse to the grave site, with officers closest to grave (see diagram).
11. As the flag-draped casket is removed from the hearse by the active pallbearers, the Funeral Detail executes a hand salute on order of the OIC. ("Present arms.") If the casket is not covered by the flag, they stand at attention.
12. After casket is placed over the grave the Funeral Detail forms ranks in front of the grave, highest rank on right (see diagram).
13. If taps are sounded, uniformed members should execute a hand salute on order of the OIC.
14. During religious graveside services all personnel will bow at words "Let us Pray."
15. All personnel, except the active pallbearers while holding the flag, will follow the example of the officiating clergy. If he uncovers, they will uncover; if he remains covered, they will remain covered.

    NOTE: These procedures and formations are accepted courtesies but act as a guideline only and may be adjusted depending upon existing conditions at funeral home, church, etc.

Inventory of Necessary Equipment

A. On hand in fire department stock room
1. Color guard standards
2. Flag for casket
3. Black plastic tape and/or elastic bands
4. Round-tipped scissors
5. 12 pairs of assorted sizes of white gloves
6. Sign to read "Fire Department Courtesy Car," (approximately 6 should be inventoried)
7. Black bunting for stations

B. Where to obtain necessary items
1. Flags: city hall or identify closest supplier
2. Color Guards: American Legion or VFW
3. Band: school or other local group
4. Additional white gloves (Army and Navy Store or identify closest local supplier)
5. Additional vehicles: city, borough, township, police department, car dealers, members of the department
6. Signs: identify a local sign painter who would be available on short notice
7. Black bunting: identify local supplier

People You May Want to Notify

State Fire Commissioner
State Public Safety Officers Benefit Program
State Fire Association Chaplain
State Firemen's Association Secretary
Federal Public Safety Officers Benefit Program
  Kathy Green
  633 Indiana Ave., NW, Rm. 784
  Washington, DC 20531
  (202) 376-8799
Local and Regional Fire Association Secretary

The Firemen's Memorial Hymn

(tune: Abide With Me)
In fond remembrance gathered here today,
Tribute to pay to brothers passed away;
Garlands of flowers placed upon the dead,
Spring's brightest blossoms deck their quiet bed.

(tune: Reveille)
When duty called, our brothers they would go,
Ever undaunted, met the fiery foe.

May guardian angels o'er them vigil keep,
While they lie resting in eternal sleep.

(tune: Taps)
Father in heaven, guide us on our way,
Through storm and sunshine to eternal day;
And when our duty here on earth is o'er
Vouchsafe our journey to the gladdened shore.

Honor Guard Roster

(Sample)

______________________ (Name of Deceased)
______________________ (Date Deceased Passed Away)

As of __________ (date) at __________ Hours (time) the department will provide an Honor Guard for the Funeral of __________ (Name of Deceased) who will/will not be buried in his uniform.

Viewing will be held at:
Name ______________________
Address ______________________
Day and Date ______________________
Time ______________________

Funeral will be held at:
Name ______________________
Address ______________________
Day and Date ______________________
Time ______________________

Honor Guards will be scheduled at 10-minute intervals between __________ and __________ hours, __________ (day and date).

__________	(Time)	__________	__________
__________	(Time)	__________	__________
__________	(Time)	__________	__________
__________	(Time)	__________	__________

Honor Guard Uniform will be ______ ______________________
Department will furnish white gloves and black breast badge bands.

A Fireman's Prayer

When I am called to duty, God
Wherever flames may rage,
Give me strength to save some life
Whatever be its age.

Help me embrace a little child
Before it is too late
Or save an older person from
The horror of that fate.

Enable me to be alert
To the weakest shout
And quickly and efficiently
To put the fire out.

I want to fill my calling and
To give the best in me.
To guard my every neighbor and
Protect his property.

And if according to my fate
I am to lose my life
Please bless with your protecting hand
My family and my wife.

Careers in the Fire Service

Careers in the Municipal Fire Service

A career in the fire service in the 1980s offers an individual a multitude of opportunities and challenges. In spite of routine entry into environments where the potential for panic and confusion prevails, the job of the fire fighter remains one of the most rewarding in the field of public service. New technology in building construction that allows for buildings of great height with increased fire load creates challenges to the fire service which were unthought of in the 1930s and 40s. Yet this same technology has given fire service personnel improved fire fighting equipment, dependable breathing apparatus, and lighter weight, more serviceable protective clothing to combat the scourge of fire. The changes technology has brought to the fire protection field have made it imperative that all persons functioning in the fire service be fully qualified and capable of efficiently performing the wide range of services necessary to protect life and property from fire.

The fire service has many unique management needs. It requires a distinct team spirit. It has a need for a strong disciplinary influence for concerted and instant reaction on the fireground. It requires a high quality of leadership from its officers. It has a continuing training demand. It requires a wide range of technical competence and the ability to deal with the public in both minor and major crisis situations.

Fire Fighter Standards

Many states have enacted legislation establishing commissions to create fire fighter standards. Such standards require that all personnel employed by the fire department must satisfactorily complete required basic training before being given permanent employment. Standards are usually expressed in measurable behavioral objectives covering both required knowledge and demonstrated skills. These standards are prepared by NFPA Technical Committees and cover entrance requirements, including medical examination, and three levels or grades of fire fighter qualifications known as Fire Fighter I, II, and III. The standards are used as a basis for nationally standardized examinations by authorized agencies and are available for adoption by federal, state, and local authorities in the United States.

Work Week

Fire fighters in some cities are on duty for 24 hours and then off for 48 hours. They receive an extra day off at intervals. In other cities they may work a 10-hour day shift for several days, a 14-hour night shift for several nights, and then have several days off. The actual hours on duty vary widely, however, and fire fighters often put in extra hours to bring fires under control. The work week may range from 40 hours a week in some cities to 56 hours a week in others.

Salaries

Salaries for fire fighters depend on the size of the city, its location, and the experience of the fire fighter. Beginning salaries range from $9,000 to $11,000 in many cities and towns to $17,000 or more a year in large cities such as New York, Los Angeles, and Chicago. Earnings for experienced fire fighters range from $17,000 to $23,000 a year. Many fire companies in rural regions consist of unpaid volunteer or partly paid fire fighters.

Most fire fighters receive allowances for dress uniforms. The departments provide helmets, boots and turn-out coats for fire fighting work. Fringe benefits vary with the location and size of the community. Liberal retirement pensions may enable fire fighters to retire at half pay at age 50. Most cities also pay injured fire fighters compensation equal to their regular pay.

Education

Educational requirements vary widely. Fire fighters in many communities must have a high school diploma or its equivalent to qualify for examinations for fire fighting. In many other places, however, applicants need not be high school graduates; in some cities, they must have a college degree. Many states have fire schools that offer courses in fire fighting and fire prevention. Community colleges offer fire protection technology programs, and some fire departments have formal apprenticeship programs.

Applicants for the job of fire fighter must be at least 18 years old, mentally alert, and healthy. They may need to meet height and weight requirements according to local regulations and may be required to be residents of the community in which they wish to work. More than 300,000 career fire fighters work in cities and towns across the country, and the U.S. Department of Labor predicts about 7,500 job openings a year through the 1980s. Budget cutting in many communities, however, may greatly reduce this number.

Selection Criteria and Methods

A 1982 survey conducted by the International City Management Association* found the following facts about fire personnel selection criteria and methods. Two percent of the 1,080 respondents reported a nonsmoking entry requirement to ensure that heart and lung disability claims are job related. Over two-thirds (68 percent) of the responding municipalities require applicants to take a physical performance test, with nearly all cities of 500,000 population and over reporting such a requirement. Almost all reporting municipalities (99 percent) require a probationary period for new recruits, usually 11 months, but as short as 3 months and as long as 3 years. Almost all of the departments surveyed (93 percent) include an oral interview; most (75 percent) require a written examination; 86 percent conduct background investigations; 95 percent require medical exams; 79 percent have a minimum age requirement, with the median age for acceptance being 18 years; and 76 percent require a minimum level of education (usually a high school diploma) for acceptance to an entry level fire fighter position.

Related Fields

Allied careers in the fire protection field include those of fire protection engineers, industrial fire fighters, safety officers, and occupational health and safety (OSHA) inspectors and federal fire fighters. These positions require different educational requirements and experience than that of a public fire fighter and employment in these areas is usually in the private sector.

For more information about fire service careers, contact James McKiernan, Senior Fire Service Specialist, National Fire Protection Association, Batterymarch Park, Quincy, MA, 02269. Telephone: (617) 328-9290.

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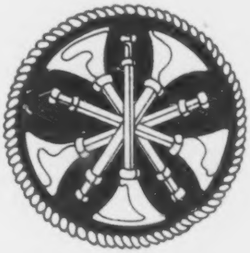
* Gerard J. Hoetmer, "Police, Fire, and Refuse Collection and Disposal Departments: Personnel, Compensation, and Expenditures," in *The Municipal Year Book 1983*, (Washington, D.C.: International City Management Association, 1983), p. 172.

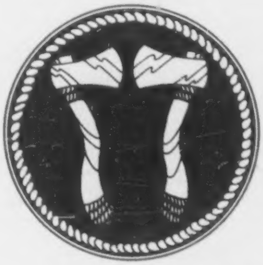
Fire Officers Rank and Insignia

Fire Chief: the principal officer of a fire department.

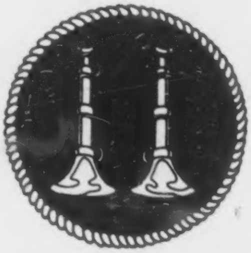


Chief

Captain: the officer in charge of a company or fire station, or any other position of comparable responsibility. Frequently the highest ranking member of an individual company.

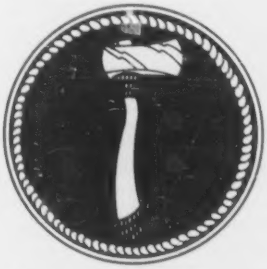


Captain — Truck Company

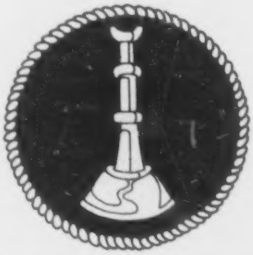


Captain — Engine Company

Lieutenant: the first officer of a fire company, in full command when the captain is absent and usually in command of one company.

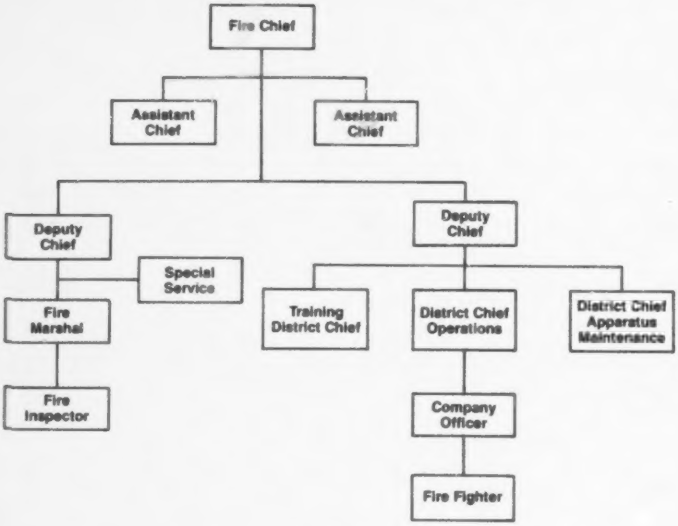


Lieutenant — Truck Company

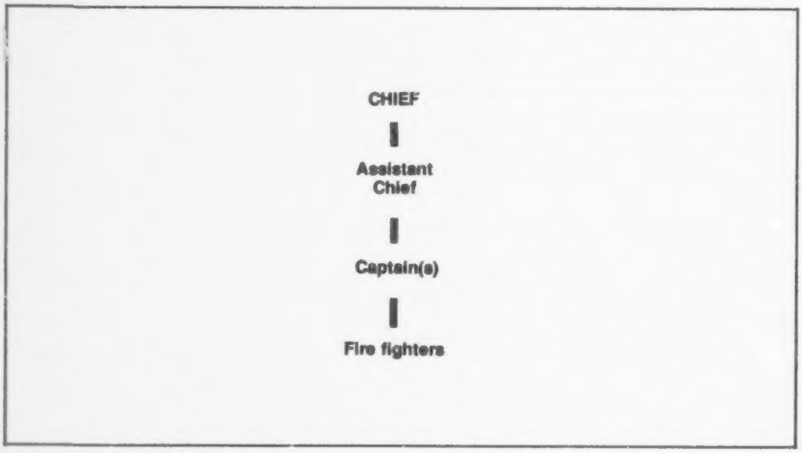


Lieutenant — Engine Company

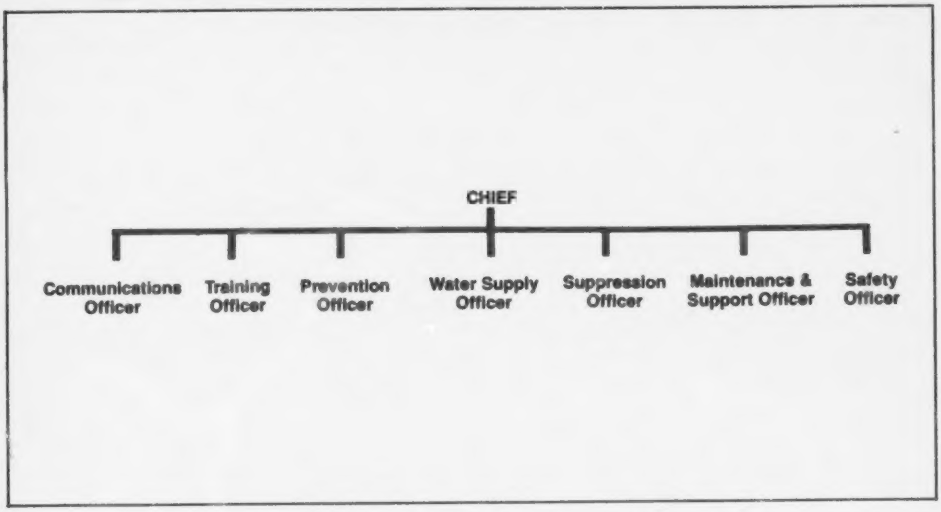
How Fire Departments Are Organized


Fire Chief
Assistant Chief
Assistant Chief
Deputy Chief
Deputy Chief
Special Service
Fire Marshal
Fire Inspector
Training District Chief
District Chief Operations
District Chief Apparatus Maintenance
Company Officer
Fire Fighter

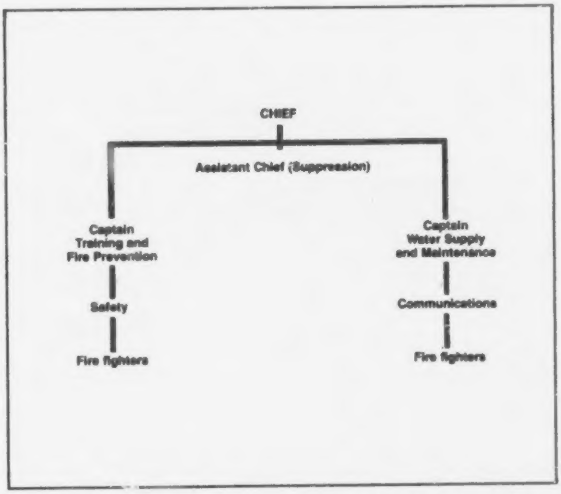
Typical organization plan for a full-time paid force.


CHIEF
Assistant Chief
Captain(s)
Fire fighters

Organization chart for a new, small department.


CHIEF
Communications Officer
Training Officer
Prevention Officer
Water Supply Officer
Suppression Officer
Maintenance & Support Officer
Safety Officer

Organization chart for a large suburban or rural department.


CHIEF
Assistant Chief (Suppression)
Captain Training and Fire Prevention
Safety
Fire fighters
Captain Water Supply and Maintenance
Communications
Fire fighters

Organization chart for the complete chain of command and staffing of a new department.

National Professional Qualifications System for the Fire Service

An important step in establishing national standards of professional competence for the fire service was taken by the Joint Council of National Fire Service Organizations (Joint Council) on October 25, 1972. The Council decided that one area of common interest where national collective action was desirable was the establishment of standards upon which the levels of competency within the fire service could be determined. The National Professional Qualifications System was established to accredit state certification programs, certify personnel, and register certified personnel on a national level. The following system is now fully operational and functioning in accordance with the directions of the Council:

1. Committees to develop standards of professional competency, made up of peer group representation; and
2. An independent Board to oversee and validate standards developed. Implementation of such standards in a nationally coordinated continuing professional development program for the fire service.

The Secretariat for Committees and Board is provided by the staff of the National Fire Protection Association.

There are four committees made up of representatives from the organizations comprising the Joint Council, in addition to certain other persons nominated by the Joint Council collectively. These four committees are responsible for recommended minimum standards of professional competence required of:

Fire Fighters (Levels I, II, III)
Fire Inspectors and Investigators (Levels I, II, III)
Fire Service Instructors (Levels I, II, III, IV)
Fire Service Officers (Levels I, II, III, IV, V, VI).

Each committee is established and operates under NFPA standards-making procedures, with one important variation. No draft standard shall be submitted to NFPA for final adoption until it has been approved by the National Professional Qualifications Board for the Fire Service.

Standards are prepared for use after final adoption as a basis for nationally standardized examinations by authorized agencies. The standards are available for adoption by federal, state and local authorities. The National Professional Qualifications Standards are also widely used by states, individual cities, and communities as a basis for the design of training and education programs. Using them will help the system to grow.

Performance Objectives

The Board directed all committees to develop standards in terms of terminal performance objectives. These objectives are considered the *minimum* necessary level of competency for a person to qualify at the respective level and in the role specified by the standard, no matter where that person is serving.

Throughout the standards, levels of numerical ascending sequence have been used to denote increasing degrees of responsibility. For example, the lowest or basic level for Fire Fighter I, II, III is I. A similar sequence is used in each standard; the total number of levels varies in accordance with the number of steps involved in the individual standard. Rank titles were not used due to variations among U.S. fire departments.

The Standards

The standards are designed so that they can be achieved in a variety of ways, including participation in state and local training programs, self-study, attendance at colleges offering suitable courses, or in combinations of these ways.

The official standards are:

NFPA 1001: Fire Fighter Qualifications
NFPA 1002: Apparatus Driver/Operator
NFPA 1003: Airport Fire Fighter
NFPA 1021: Fire Officer (Levels I through VI)
NFPA 1031: Fire Inspector/Investigator/Prevention Education Officer
NFPA 1041: Fire Service Instructor

An additional standard, NFPA 1004: Fire Medical Technician, is under development. Under the NFPA system, all standards are either revised or reconfirmed within five years of issue to ensure that current needs and changing technology is reflected by the standards.

Use of Standards

The standards are only the first step; they identify the skills, knowledge and performance required to competently fulfill the relevant positions and career levels in the fire service. Although the standards are not a training program, they can be used as a basis for developing training and education programs that will prepare candidates to meet the objectives given in the standards.

Recognition of Qualifications

One of the reasons for the establishment of the National Qualifications System was to provide recognition for those who are qualified. This is usually achieved by certification. Certificates are sometimes issued by individual fire departments or, more often, by a state commission or certification agency. Since recognition on a national basis had not been available, the Joint Council felt this void should be filled.

National Certification of Fire Service Personnel

A controlled testing procedure that can be used to officially certify fire service personnel who have demonstrated their competency is necessary. The Board reviews the validity and quality of testing procedures established by state and local authorities, and accredits such procedures.

Accreditation of State Agencies

The accreditation program under the National Professional Qualifications System provides a means of uniform recognition of achievement of qualifications to the levels of competency specified in the standards. Therefore, the National Professional Qualifications Board for the Fire Service will accredit under the system any state that applies for accreditation and agrees to meet the criteria specified. In states where there is no agency with statutory authority to certify fire service personnel, a group or organization representing all fire service interests can apply, provided there is no statutory restriction on certification within that state.

The accreditation of state groups provides a means of integration rather than duplicating the certification process. It also provides for national recognition of both the state system and the achievements of individuals. Entry by a state agency or group is voluntary and the authority of the state is in no way diminished. The Joint Council and the Board decided on this method initially. Throughout the developmental stages, this decision has proved to be the best way to deal with an issue of personal concern to individuals in the fire service. The program is not competitive with any state system of certification and allows for the recognition of professional achievements by members of the public fire services.

A state agency that wishes to be accredited will be expected to meet certain criteria designed to ensure integrity, validity, fairness, and uniformity in the testing and assessment of the state certification system. The agency should be prepared to accept a limited degree of supervision by the National Professional Qualifications Board in this regard.

The state agency is asked to make a commitment to follow the criteria and agree to provide the Board with details about the state system. Next, the Board team will visit the state to review the state process and witness typical testing and assessment procedures. If the Board finds that the state system meets the criteria, accreditation will be given to the state. Then, when the state awards a state certificate to a qualified person, it will say that the person is qualified under the National System. Provision has also been made for a separate national certificate to be issued by the Board to persons certified under the system. This is an option that may be exercised either by the state agency or by an individual. A charge of $10.00 is made for issuance of a national certificate. Otherwise, the only cost for accreditation to a state agency or statewide organization is the expense of visits by the Board's accreditation team, usually two persons.

Although the criteria for accreditation is detailed, it is expected to be met in intent and objective by the accredited state agency. A pilot test conducted during 1979 and 1980 resulted in changes and amendments, enabling states with differing systems and methods to meet the objectives of accreditation.

Presently, the National Professional Qualifications Board can accredit only state level agencies or groups. Individual fire departments using the Professional Qualifications standards cannot be accredited. Where no state-provided certification system is available, the Board suggests that interested fire service personnel explore the possibility of establishing a voluntary state system. As an interim step, the Joint Council is considering accepting county and individual fire departments pending establishment of statewide systems.

Operation of System

Three states—Iowa, Oregon, and Oklahoma—were pilot-tested in 1979 and 1980. After adjustments both to their systems and the Board's criteria, the systems in these states were accredited. Approximately 3,000 persons have been certified by these states and are now registered with the National Professional Qualifications Board. Those certified persons who elect to receive a national certificate can apply for one; national certificates are now being issued.

Virginia, Louisiana, Kansas and Georgia have also become accredited. Alabama is in the accreditation process and is expected to be accepted into the system by early 1984. Other states are preparing the documentation for accreditation and further applications are expected to be received on a continuing basis.

The U.S. Air Force Institute at Chanute, Illinois, which had been designated under an inter-agency agreement as the central establishment for certification of federal fire fighters, is in the process of accreditation.

Most U.S. Fire Academy courses are designed to meet objectives of the National Professional Qualifications Standards.

Inquiries have been received from countries outside the United States for possible accreditation under the U.S. System. There have also been inquiries as to the potential for reciprocal arrangements between the U.S. system and those already established in foreign countries. Although no agreements have yet been negotiated, the matter is being considered by the Board and Joint Council.

National Professional Qualifications Board

A nine-person Board is appointed by the Joint Council to act on behalf of the Council. The Board meets periodically as required to administer the system. Listed below are the Board's duties and responsibilities:

1. The Board is constituted to supervise a nationally coordinated continuing professional development program for the fire service.
2. It shall correlate, review and validate draft standards prepared by the Technical Committees established to produce professional standards for each level of fire service responsibility.
3. It shall approve all draft standards before such are submitted for final adoption procedures under the NFPA standards system.
4. It shall be responsible for the accreditation and supervision of any national programs of certification and shall coordinate with implementing agencies to ensure validity and reliability of the evaluation criteria used in connection with such programs.

Current Members of the Board

Allan R. Stone, Chief (Chairman, 1983*)
Glendale Fire Department
633 E. Broadway, Suite 303
Glendale, CA 91205
(213) 956-4815
(*New Chairman, to be appointed December 1983, unknown at presstime.)

Martin E. Grimes (Secretary and Administrator)
Vice President
National Fire Protection Association
Batterymarch Park
Quincy, MA 02269
(617) 770-3000

David B. Gratz, Director
IAFC Foundation
9316 Brookville Rd.
Silver Spring, MD 20910
(301) 588-8791

Charles Hendricks, President
International Association of Black Professional Fire Fighters
5332 Kershaw St.
Philadelphia, PA 19131
(215) 477-1806

John W. Hoglund, Director
Fire and Rescue Institute
University of Maryland
College Park, MD 20740
(301) 454-2416

Frank E. Oberg
Associate Director
Fire Service Information,
Research & Information Center
University of Minnesota
3300 University Ave., SE
Minneapolis, MN 55414
(612) 376-3535

Duane Pell, President
Professional Fire Fighters of Arizona
1650 E. Myrtle Ave.
Phoenix, AZ 85020
(602) 997-1231

Sandra S. Payne
Personnel Research Psychologist
Personnel Research & Development Center
Room 3226
Office of Personnel Management
1900 E St., NW
Washington, DC 20415
(202) 632-5428

Gary L. Thomas
Michigan State Firefighters Association
419 S. Washington Ave., Suite 104
Lansing, MI 48933

Further information about the system can be obtained from Martin Grimes, Administrative Secretary, National Professional Qualifications Board, NFPA, Batterymarch Park, Quincy, MA 02269.

The Federal Fire Service

A majority of the material for this report was taken directly from the "Preliminary Report on the Protective Occupations Study—Part I (Fire Protection and Prevention Occupation)," June 1981, pp. 1-49, U. S. Office of of Personnel Management, Compensation Group, Office of Compensation Program Development, 1900 E St., NW, Room 2416, Washington, DC 20415.

Employee Distribution by Agency

There are more than 23,000 federal government employees directly involved in fire engineering, fire suppression, fire prevention, or closely allied safety services at the federal level. Nearly 11,000 of these are civilian employees classified as Safety Specialists within the Fire Protection and Prevention Series, GS-081, for pay and compensation. Fire protection engineering professionals are classified within the GS-804 Series and others are within the GS-803 Series which includes Safety Engineers.

More than 7,700 employees are military personnel whose Military Occupational Specialties (MOS), ratings, or military job descriptions primarily involve the direct provision of firesafety services. Many of these employees provide base or installation fire protection services in both the United States and abroad.

In addition, there are consultants and other personnel not included here who may be hired on a temporary basis for specific activities. Also not included here are engineers, occupational safety and health specialists, or similar professionals who assist in the design, construction, maintenance, or operation of buildings, equipment, and facilities whose activities may indirectly have impact on fire protection conditions.

Tables 1 and 2 show the distribution of civilian federal fire fighters by department or independent agency.

TABLE 1
NUMBER OF GENERAL SCHEDULE FIRE FIGHTERS BY INDEPENDENT AGENCY

Agency	Total
Federal Emergency Management Agency	3
General Services Administration	73
National Aeronautics and Space Administration	25
Smithsonian Institute	4
Veterans Administration	508
Unspecified	61
TOTAL	674*

TABLE 2
NUMBER OF GENERAL SCHEDULE FIRE FIGHTERS BY DEPARTMENT

Agency	Total
Agriculture	9
Commerce	18
Energy	137
HHS	35
Interior	59
Transportation	144
TOTAL	402*

*A majority of the material for this report was taken directly from the "Preliminary Report on the Protective Occupations Study — Part I (Fire Protection and Prevention Occupation)," June, 1981, pages 1-49, U.S. Office of Personnel Management, Compensation Group, Office of Compensation Program Development, 1900 E Street, N.W., Room 2416, Washington, DC 20415.

During the 19th century, the public developed an enthusiastic interest in watching fires. Lillie Hitchcock Coit, a San Francisco socialite, was the most famous fire "buff" of the time. As a girl, she attended fires with the Knickerbocker Engine Company 5 with whom she became an honorary member. She wore a gold "5" pin until her death. The Coit memorial on Telegraph Hill in San Francisco is a 540-foot observation tower, shaped like a fire nozzle, that was constructed as requested by her with money she left to the city.

NUMBER OF MILITARY FIRE FIGHTERS BY DEPARTMENT

Department of Defense Agency	Total Fire Protection Personnel	GS-081	Fire Prot. Spec.	Military	Contract	Foreign Nationals
Department of Army	4,430	2,399	13	264	444	1,410
Department of Navy	5,884	4,413	38	845	37	551
Marine Corps	1,677	572	—	927	—	178
Air Force	9,632	3,221	30	5,666	—	715
Other	79	79	—	—	—	—
TOTALS**	21,702	10,605	81	7,702	481	2,854

**Derived from "Management Study of Fire Protection in the Department of Defense," 1981, Department of Defense.

Duties of Federal Fire Service Fire Fighters

Fire fighters in the federal service are employed at a variety of government installations that have wide variety of facilities, such as office and residential buildings; shops and manufacturing plants; ships and piers; fuel, chemical, and weapons storage areas; warehouses; brush and wooded areas; aircraft and airfield structures, etc. The current classification standard for the Fire Protection and Prevention Series, GS-081, defines this occupation as "positions that involve supervising or performing work in controlling and extinguishing fires; in rescuing persons endangered by fire; and in preventing fire by reducing or eliminating potential fire hazards." It also covers "... nonengineering work in developing and implementing fire protection and prevention plans, procedures, and standards. Positions in this occupation require a knowledge of firefighting and fire prevention theory and techniques; a knowledge of the operation of fixed and mobile firefighting equipment; and/or the ability to plan and direct fire protection and prevention programs and operations."

The specific duties common to most, if not all, federal fire fighters include the following:

Fire Fighter

- Unreels, lays out, operates, and directs hose lines discharging water or other fire suppressing agents.
- Enters structures to locate and extinguish seat of fire. Climbs ladders carrying heavy hoses or portable extinguishers. Makes forced entries by prying open or breaking doors, windows, etc.
- Makes forced entry into burning or damaged aircraft and ships to rescue passengers and crew and to extinguish the fire. Uses hand and power tools as necessary. Heavy physical exertion is required as well as speed and agility.
- Ventilates burning structures by opening doors and windows, or other existing openings. Sometimes cuts new openings in roofs and walls.
- Performs rescue operations including climbing ladders, forcible entry, moving obstructions, and moving through hot, smoke-filled structures to locate and assist or carry victims out of the danger areas.
- Performs salvage and overhaul operations.
- Maintains equipment.
- Attends daily drill and/or training sessions.
- Makes fire prevention inspections for routine fire hazards such as rubbish

accumulations, improper use of common flammable liquids, blocked or broken fire exits and panic hardware, and frayed or misused electrical cords. May make routine checks and tests (e.g., flow tests) and perform minor maintenance (e.g., replace sprinkler heads, recharge extinguishers, etc.).

- In addition to these general duties, fire fighters at specific installations often have specialized duties and require special knowledges peculiar to that installation. These duties and knowledges may relate to the presence of nuclear, biological, or chemical agents; unique or experimental explosives or flammable materials; patients (general medical and/or psychiatric) in a hospital; or other unusual conditions.
- Federal fire fighters also perform a variety of additional tasks that are only indirectly related, if at all, to the job of fighting and preventing fires. These include: providing emergency medical service, involving operating the ambulance at the facility and often requiring additional training of the fire fighters as Emergency Medical Technicians (EMT) or, on occasion, as paramedics; cleaning up or otherwise handling fuel and chemical spills and other "accidents" involving toxic, biological, and/or radioactive materials; maintaining aircraft barriers; removing passengers from stalled elevators; and performing miscellaneous maintenance functions when employees regularly assigned to perform them are not on duty; etc. Many of these functions are assigned to the fire department because they are on duty around the clock and/or they have the basic skills necessary to perform them.

Fire Fighter (Driver/Operator)

- Must know all the duties of the fire fighter.
- Drives and performs light maintenance on mobile fire fighting equipment. Must be able to drive safely; know the best routes, including alternates, to fire locations; place truck in proper position to fight particular kinds of fires under varying conditions; know how to operate the equipment, such as pumps, turrets, etc.; and possess a knowledge of basic hydraulics to determine amount of pressure to pump according to the number and size of lines being serviced and to take full advantage of the amount of water available.
- Normally takes charge of the crew in the absence of a regularly assigned crew chief.

Fire Inspector

Fire inspectors prevent fires by physical inspection of facilities to detect and reduce or eliminate the hazards that cause fires. They also inspect new construction for inclusion of appropriate fire prevention materials and equipment. In addition, they participate in investigations of fires to determine the cause by inspecting damaged areas and interviewing witnesses. Fire inspection work requires a thorough knowledge of the applicable codes, regulations, practices and procedures; ability to recognize potential fire hazards and adapt or develop procedures for reducing or eliminating them; and tact and firmness in dealing with proper authorities to have corrective actions taken.

Fire Communications Operator

Fire communications operator positions are concerned with operating communications equipment such as telephones, telegraph, switchboards, radio, etc., to receive and transmit verbal or coded alarms and messages in connection with fire protection and prevention programs. In addition to the knowledge of communications equipment, these positions require a basic knowledge of fire fighting techniques; location, availability, and capability of fire fighting equipment; responsible officials to be notified in different kinds of fire emergencies; and other similar information required for the effective dispatching of employees and equipment.

Crew Chief

A crew chief is responsible for directing and participating in the work of the crew (i.e., two to eight fire fighters), and for one piece of motorized fire fighting equipment. Typically, the crew chief performs the following:

- Directs the crew in fire fighting activities, working from specific orders from higher level supervisors at the scene. In crash/rescue operations, frequently serves as prime rescuer.
- Directs and participates in practice drills and training classes for the assigned crew.
- Directs crew in fire protection inspection functions.
- Assigns crew members to station maintenance work, such as cleaning equipment, etc.
- Prepares reports for supervisor concerning fire runs, training, inspections, etc.
- In the absence of the supervisor, takes charge of all fire fighting activities at the scene of a fire.

Assistant Chief

Assistant Chiefs (sometimes called shift supervisors) are in immediate charge of fire fighting and fire prevention on an assigned shift. There are usually two or three assistant chief positions rather than, or at very large installations in addition to, one overall deputy, each of whom participates in the fire chief's administration, planning, and training activities only on the assigned shift. Because of the nature of shift operations, assistant chiefs are frequently the senior officers on duty, and are required to make decisions on administrative matters of a nonpolicy nature and in emergency situations, e.g., at the scene of a fire. When the fire chief is on duty (normally on the day shift), the shift supervisors serve as second-in-command, providing immediate direction of the operations of the department and carrying out the policies and instructions of the chief. The chief often consults shift supervisors for their views regarding all phases of the program.

Fire Chief

Fire Chiefs are responsible for the overall management and supervision of the fire protection and fire prevention programs for a federal installation, including tenant activities and smaller installations under their jurisdiction. They develop, coordinate, and implement programs, policies, regulations, and procedures and serve as technical advisors to management on all matters pertaining to fire protection and prevention. They exercise full supervisory responsibility for a fire fighting and fire protection inspection force.

Work Schedules

Most federal fire fighters do not work an 8 hours per day, 40 hours per week schedule like most other employees. Rather, the great majority of federal fire fighters, primarily those in the Department of Defense (DOD), have tours of duty of 72 hours per week.

At the present time, it appears that the 72-hour workweek will remain in effect for some time to come, since the DOD, with 90 percent of the federal fire fighters, has been consistently opposed to reducing the workweek to coincide with the predominant practice in the non-federal sector of 56 hours. The overriding concern of the DOD is the lack of additional slots in the manpower ceiling and the cost that would result if additional fire fighters had to be hired to maintain current levels of protection.

A much smaller number of federal fire fighters has tours of duty of 60 hours, 56 hours, 54 hours, and possibly other tours as well. Under these extended tours, fire fighters are on duty for 24 hours straight and then normally have at least one 24-hour period off.

The 24-hour tour of duty is comprised of three major categories of activities: (1) scheduled work; (2) stand-by, during which time the employees must remain at the fire station but are otherwise free to pursue whatever activities they desire, such as reading, TV, sports, physical fitness, etc.; and (3) sleeping. During the stand-by and sleep periods, the employee may be called on to perform work of an "emergency" nature. These emergencies may range from responding to a fire alarm, to providing first aid to a sick or injured person, to occasionally fixing a leak in the plumbing.

Pay Practices

According to current laws and regulations, a federal fire fighter is compensated for an extended tour of duty under two separate premium pay provisions. Under 5 *U.S.C.* 5545, a fire fighter receives premium pay on an annual basis because he is required "regularly to remain at, or within the confines of his station during longer than ordinary periods of duty, a substantial part of which consists of remaining in a stand-by status rather than performing work." This premium varies from 5 percent to 25 percent depending on the number of hours in the tour of duty, the number of hours actually required to work (as compared to being in a stand-by status), and the number of Sundays worked in the course of the year. Since most fire fighters have a 72-hour tour of duty including at least 40 Sundays, they receive the maximum of 25 percent as their annual premium. This annual premium is considered as part of base pay for retirement purposes. Until 1974, this comprised the total salary paid to federal fire fighters.

With the enactment of the Fair Labor Standards Act Amendments of 1974, which contained special provisions applicable to federal fire fighting and law enforcement personnel, federal fire fighters also became entitled to overtime payment, at the rate of 1½ times their hourly rate, for all hours over a specified amount, that number now being 54. (State and local governments are exempted from coverage of FLSA.) Numerous problems exist due to variations in the way overtime is computed, not only between agencies, but at different installations at the same agencies.

Comparison of Work Performed

Over the years, there have been long-standing discussions about whether the work performed by fire fighters in the federal government and in the municipal sector is equal or at least substantially equivalent. In an effort to resolve this question, a 1975 study compared protective occupations in the non-federal sector with their counterparts in the federal service. During that study, the project staff visited ten cities selected for their geographic location and population size. They interviewed personnel officials and fire department officials in each city.

The overall view of those persons interviewed was that individual fire fighters in municipal settings perform essentially the same duties as many of those in the federal sector. Fire officials also expressed the opinion that many federal installations have facilities and materials that are at least as difficult from a fire fighting standpoint as those of the average city. Many federal installations, particularly military bases (at which the great majority of federal fire fighters are employed — approximately 90 percent), have many kinds of unusual and highly hazardous facilities, equipment, and material, such as aircraft hangars, fuels, explosives, nuclear materials, tactical aircraft, chemical and biological agents, etc., in addition to the more conventional facilities, i.e., homes, office buildings, stores, banks, etc. The presence of these unusual facilities often imposes a requirement for more extensive knowledge and training than is typical of municipal fire fighters.

On the other hand, municipal fire fighters typically have a greater number and variety of actual fires to fight, do not often know in advance what kinds of hazards they will encounter, and because of these two factors, also face considerably more dangerous situations than do their federal counterparts. Based on an analysis of the specific nature of the fire fighting work performed, the potential for fire fighting problems, and the number and variety of hazardous conditions, the report concluded that the work of federal and non-federal fire fighters is, if not exactly the same, then at least reasonably equivalent and therefore comparable. The report did recognize the limitations in generalizing from a study based on a small sample of cities and the very limited fact-finding upon which that report was based.

There are also those who believe that the work of federal fire fighters is much less demanding and less hazardous than the typical non-federal fire fighter. The reason most often given for this is that federal fire fighters work in a much more controlled environment than municipal fire fighters. At a federal installation, fire inspections and pre-fire planning can result in a rather complete knowledge of what hazards exist and where those hazards are located. In addition, the fire chief can often ensure that hazards are corrected.

Conversely, municipal fire departments are restricted by privacy laws from conducting fire prevention inspections in private dwellings unless asked to do so by the resident. Even when hazards are found during voluntary inspections, municipal fire departments are often unable to require that correctable hazardous conditions be remedied. To a lesser extent, this is also true of private commercial and industrial facilities. Thus, the municipal fire fighter may well be subject to a greater risk of injury than the federal fire fighter simply because of the inability of municipal departments to control potential hazards and prevent fires from occurring.

While both municipal and federal fire fighters are trained to perform identical (or at least similar) duties, the relatively low incidence of large fires at federal installations means that federal fire fighters have less occasion to perform these duties than do their municipal counterparts. However, the number of actual fires encountered may not substantially affect the difficulty or value of the fire fighter's job. The level of training and skills required to deal with potential problems would seem to be one of the key issues in determining job value.

The job of the non-supervisory fire fighter, whether in municipal or federal employment, primarily involves a variety of specific knowledges and skills which can be learned and perfected through regular and recurring training and practice. Unlike the job of the police officer, which varies in difficulty according to the kinds of situations encountered and the nature of unassisted decisions made, fire fighters often have two or three levels of supervisors on-site who make decisions as to the methods and procedures that will be followed in handling most situations. These methods and procedures are constantly taught and drilled so that the fire fighter can carry them out from a brief instruction when faced with a specific situation. Thus, given the potential for equally difficult fire situations, the federal fire fighter learns and practices the knowledges and skills required to fight the many kinds of fires that may occur, but uses them primarily under simulated conditions, whereas his municipal counterpart uses the same knowledges and skills but more often in real fire situations. Therefore, within the job of controlling and extinguishing fires, there are counterbalancing characteristics to be considered. On one hand, the municipal fire fighter encounters a greater degree of hazard inherent in real fire situations as compared to simulated fires or practice drills encountered by federal fire fighters. On the other hand, because of the unique nature of the facilities and materials found on many federal installations, federal fire fighters must have a greater degree of knowledge and training in order to adequately and safely deal with those diverse and unusual fire situations, should they occur.

When comparing fire chiefs and the other higher level supervisory positions between the two sectors, there are differences. Municipal fire departments generally have more employees, operate more fire stations, and cover a larger area than is typical of federal installations. Consequently, city fire chiefs and subordinate managers must possess a significantly higher level of managerial and supervisory skills than their federal counterparts. Accordingly, they can command commensurately higher salaries.

The Federal Fire Service Task Group

The Federal Fire Service Task Group (FFSTG), a group of federal fire protection professionals, has been quietly revamping how various federal departments and agencies provide fire protection services. Using the tenets of modern fire protection and life safety principles, the "Task Group" has been instrumental in bringing about changes which have improved fire protection services to their agencies and protecting federal civilian employees, military personnel and their families and, most of all, the interests of the American taxpayer.

The Task Group, which normally meets in the Washington, DC area, represents the personnel of more than 829 federal or military-operated fire departments. Included in the Task Group are: federal fire service managers; fire protection specialists; chiefs; deputy chiefs and assistant chiefs of base and installation fire departments; fire protection program coordinators, and other individuals who direct fire protection; fire prevention, or life safety programs with most of the departments and agencies of the federal government.

During the last several years, the Task Group has been organized on an ad hoc basis under the auspices of the United States Fire Administration of the Federal Emergency Management Agency. On December 15, 1981, a charter was given to the Task Group by the USFA. A coordinator from the staff of the USFA was designated to interact between the FFSTG and provide the necessary administrative support. Bylaws for the group were adopted in February 1983.

Through their activities over the past several years, the participants of the Federal Fire Service Task Group have provided mutual encouragement, facilitated exchange, allowed coordination, and provided mutual assistance resulting in many of the progressive changes that have been taking place in federal fire protection. Many of their attempts have been aimed at avoiding duplication of effort and providing for more efficient federal operations.

Women in the Fire Service

More and more today, fire departments are having to accommodate themselves to the entry of women in their ranks. This development often causes chiefs to ask: What anti-discrimination laws apply? Where can I find protective clothing to fit female recruits? How do I develop valid physical performance evaluations for women? How do I integrate women in training programs? What fire departments have been successful in hiring women?

This section contains information about laws, programs, protective clothing, and publications, and lists of people and organizations who have experience with the problems encountered with the entry of women into the fire service. The information has been excerpted from *Management of the Entry of Women in the Fire Service: A Management Directory*. The *Directory* contains a comprehensive list of programs and information, including examples (not reprinted here) that various departments have developed and used successfully. It was compiled by Carol Vougioukles of the International Association of Fire Fighters for the Federal Emergency Management Agency. The complete *Directory* is available through principal officers of your nearest IAFF local.

Career Fire Departments with Women

Career departments with women in fire suppression are listed in this section.

Alaska
Anchorage Fire Dept.
211 W. 7th St.
Anchorage 99501
(907) 264-4471

Arkansas
Little Rock Fire Dept.
P.O. Box 4081
Little Rock 72214
(501) 371-4796

Arizona
Phoenix Fire Dept.
1650 E. Dreamy Draw
Phoenix 85020
(602) 262-6002

California
Edwards AFB Fire Dept.
P.O. Box 518
Edwards 93523
(805) 277-4581

Milpitas Fire Dept.
455 E. Calaveras Blvd.
Milpitas 95035
(408) 942-2310

Oakland Fire Dept.
1330 Grove St.
Oakland 94612
(415) 444-3322

Orange City Fire Dept.
P.O. Box 6662
Orange 92667
(714) 538-5808

Rialto Fire Dept.
131 S. Willow Ave.
Rialto 92376
(714) 875-3410

Sacramento Fire Dept.
3101 Stockton Blvd.
Sacramento 95820
(916) 449-5366

San Diego Fire Dept.
1222 First Ave.
San Diego 92101
(714) 236-5509

San Jose Fire Dept.
801 N. First St.
San Jose 95110
(408) 277-4251

Santa Barbara Fire Dept.
4410 Cathedral Oak Rd.
Santa Barbara 93110
(805) 964-6807

Santa Clara Fire Dept.
777 Denton St.
Santa Clara 95051
(408) 253-1165

Santa Maria City Fire Dept.
110 E. Cook St.
Santa Maria 93454
(805) 925-0951

Tulare Fire Dept.
800 S. Blackstone
Tulare 93274
(209) 688-2001

Colorado
Boulder Fire Dept.
P.O. Box 791
Boulder 80306
(303) 441-3351

Fort Collins Fire Dept.
505 Peterson St.
Fort Collins 80234
(303) 484-4220

West Adams Fire Dept.
10550 Huron St.
West Adams 80234
(303) 452-6024

Connecticut
Hartford Fire Dept.
275 Pearle St.
Hartford 06103
(203) 525-3123

State of Connecticut Fire Dept.
525 Main St.
Branford 06405
(203) 728-5138

Washington, DC
District of Columbia Fire Dept.
614 H. St., NW
Washington, DC 20001
(202) 754-2343

Washington National Airport Fire Dept.
Dulles International
Washington, DC 20041
(202) 557-7882

Florida
Boynton Beach Fire Dept.
P.O. Box 310
Boynton 33435
(305) 734-8116

Clearwater Fire Dept.
610 Franklin St.
Clearwater 33516
(813) 462-6300

Cocoa Fire Dept.
113 S. Fiske St.
Cocoa 32922
(305) 636-6667

Dayton Beach Fire Dept.
301 S. Beach St.

Dayton Beach 32014
(904) 255-1431

Dunedin Fire Dept.
P.O. Box BB
Dunedin 33528
(813) 736-3280

Fort Lauderdale Fire Dept.
301 N. Andrews Ave.
Fort Lauderdale 33302
(305) 458-2311

Hallandale Fire Dept.
121 S.W. Third St.
Hallandale 33009
(305) 458-2311

Jacksonville Fire Dept.
107 Market St.
Jacksonville 32202
(904) 633-5430

Maitland Fire Dept.
P.O. Box 66
Maitland 32751
(305) 644-8895

Margate Fire Dept.
600 Rock Island Rd.
Margate 33063
(305) 971-7010

Metro Dade Co. Fire Dept.
6000 S.W. 87th Ave.
Miami 33173
(305) 596-8600

Miami Fire Dept.
275 N.W. Second St.
Miami 33128
(305) 579-6300

Miami Beach Fire Dept.
2300 Pine Tree Dr.
Miami Beach 33140
(305) 673-7179

Miramar Fire Dept.
8909 Miramar Parkway
Miramar 33023
(305) 431-8200

Old Dixie Fire Dept.
6930 Barbour Rd.
West Palm Beach 33407
(305) 844-1444

Orlando Fire Dept.
P.O. Box 2846
Orlando 32802
(305) 849-2390

Palm Beach Fire Dept.
P.O. Box 2029
Palm Beach 33480
(305) 655-5347

Pembroke Pines Fire Dept.
9500 Pines Blvd.
Pembroke Pines 33024
(305) 431-2200

Pinellas Park Fire Dept.
5000 82nd Ave., N
Pinellas Park 33565
(813) 544-8834

Seminole Fire Dept.
11195 70th Ave.
Seminole 33542
(813) 393-7811

Tallahassee Fire Dept.
327 N. Adams St.
Tallahassee 32301
(904) 224-0712

Tampa Fire Dept.
808 Zack St.
Tampa 33602
(813) 223-8171

Trail Park Fire Dept.
3439 Lucerne Ave.
Lake Worth 33461
(305) 965-1872

Georgia

Atlanta Fire Dept.
46 Courtland St., SE
Atlanta 30335
(404) 658-6901

Cobb County Fire Dept.
P.O. Box 7237
Marietta 30065
(404) 427-5334

Douglasville Fire Dept.
6771 Church St.
Douglasville 30134
(404) 942-9942

Illinois

Chicago Fire Dept.
121 N. LaSalle, Room 105
Chicago 60602
(312) 744-4406

Des Plains Fire Dept.
405 Des Plains Ave.
Des Plains 60016
(312) 391-5340

Elk Grove Village Fire Dept.
101 Biesterfield Rd.
Elk Grove Village 60007
(312) 439-3902

Rockford Fire Dept.
204 S. First St.
Rockford 61104
(815) 987-5668

Waukeegan Fire Dept.
105 N. West St.
Waukeegan 60085
(312) 689-7503

Wheeling Fire Dept.
255 W. Dundee Rd.
Wheeling 60090
(312) 459-2662

Indiana

Fort Wayne Fire Dept.
One Main St., Room 350
Fort Wayne 46802
(219) 423-7011

Indianapolis Fire Dept.
555 N. New Jersey St.
Indianapolis 46204
(317) 923-2815

LaPorte Fire Dept.
809 W. 18th St.
LaPorte 46350
(219) 362-8317

Pike Township Fire Dept.
P.O. Box 68300
Pike Township 46268
(317) 299-0424

Washington Township Fire Dept.
2508 E. 71st St.
Washington Township 46220
(317) 251-6658

Iowa

Davenport Fire Dept.
331 Scott St.
Davenport 52801
(319) 326-7916

Kansas

Hutchinson Fire Dept.
18 E. B St.
Hutchinson 67501

Kentucky

Covington Fire Dept.
100 E. Robbins
Covington 41011
(606) 431-0462

Mayfield Fire Dept.
104 N. 6th
Mayfield 42066
(502) 247-1331

Louisiana

Baton Rouge Fire Dept.
2332 Florida Blvd.
Baton Rouge 70802
(504) 389-4660

Crowley Fire Dept.
P.O. Box 1712
Crowley 70526
(318) 783-2144

Kenner Fire Dept.
1801 Williams Blvd.
Kenner 70026
(504) 468-7241

Lawrence Fire Dept.
745 Vermont St.
Lawrence 66044
(913) 843-3322

Shreveport Fire Dept.
2701 Meadow St.
Shreveport 71108
(318) 635-6948

Maine

Lewiston Fire Dept.
2 College St.
Lewiston 04240
(207) 782-6247

Maryland

Anne Arundel County Fire Dept.
P.O. Box 276
Millersville 21108
(301) 987-4010

Baltimore County Fire Dept.
800 N. York Rd.
Towson 21204
(301) 494-4519

Montgomery County Fire Dept.
101 Maria St.
Rockville 20850
(301) 251-2444

Prince Georges County Fire Dept.
Room 2132, County Admn. Bldg.
Upper Marlboro 20870
(301) 952-4728

Massachusetts

Lexington Fire Dept.
45 Bedford St.

Lexington 02173
(617) 862-0500

Nantucket Fire Dept.
Lower Pleasant St.
Nantucket 02554
(617) 228-2324

Michigan
Ann Arbor Fire Dept.
111 N. Fifth Ave.
Ann Arbor 48104

Detroit Fire Dept.
250 W. Larned St.
Detroit-48226
(313) 224-2035

Minnesota
Columbia Heights Fire Dept.
555 Mill St, NW
Columbia Heights 55421
(612) 788-9221

Mississippi
Jackson Fire Dept.
555 S. West St.
Jackson 39201
(601) 960-1392

Missouri
Columbia Fire Dept.
P.O. Box N
Columbia 65205
(314) 874-7391

Independence Fire Dept.
103 N. Main St.
Independence 64050
(816) 836-8300

Kansas City Fire Dept.
414 E. 22nd St.
Kansas City 64108
(816) 471-1818

Lee's Summit Fire Dept.
207 S. Douglas St.
Lee's Summit 64063
(816) 251-2343

St. Charles City Fire Dept.
200 N. Second St.
St. Charles 63301
(314) 925-2000

New Jersey
Newark Fire Dept.
1010 18th Ave.
Newark 07106
(201) 733-7426

New Mexico
Albuquerque Fire Dept.
P.O. Box 258
Albuquerque 87103
(505) 766-7884

Bernalilo County Fire Dept.
1120 Coors Rd., SW
Coors 87195
(505) 766-4205

Farmington Fire Dept.
301 N. Auburn St.
Farmington 87401-5894
(505) 327-6351

Las Cruces Fire Dept.
P.O. Drawer CLC
Las Cruces 88004
(505) 526-0270

New York
Buffalo Fire Dept.
2401 City Hall
Buffalo 14213
(716) 856-4200

North Carolina
Charlotte Fire Dept.
125 S. Davidson St.
Charlotte 28205
(704) 374-2130

Raleigh Fire Dept.
220 S. Dawson St.
Raleigh 77601
(919) 755-6360

Southern Pines Fire Dept.
Morganton Rd.
Southern Pines 28387
(919) 692-2720

Ohio
Columbus Fire Dept.
555 E. Rich St.
Columbus 43215
(614) 221-3132

Granville Fire Dept.
P.O. Box 202
Granville 43023
(614) 587-0261

Miamisburg Fire Dept.
10 N. First St.
Miamisburg 45342
(513) 866-3303

Newark Fire Dept.
40 W. Main St.
Newark 43055
(614) 345-6075

Ottawa Hills Fire Dept.
2125 Richardo Rd.
Ottawa Hills 43606
(419) 531-4211

Randolph Township Fire Dept.
6996 Taywood Rd.
Englewood 45322

Oklahoma

Edmond Fire Dept.
925 E. 2nd St.
Edmond 73034

Norman Fire Dept.
411 E. Main St.
Norman 73071
(405) 321-8696

Oregon

Albany Fire Dept.
110 E. 6th Ave.
Albany 97321
(503) 967-4340

Corvallis Fire Dept.
P.O. Box 1083
Corvallis 97339
(503) 757-6901

Cottage Grove Fire Dept.
233 Harrison St.
Cottage Grove 97424
(503) 942-4493

Pennsylvania

Letterkenny Army Depot Fire Dept.
Chambersburg 17201
(717) 264-1411

McKeesport Fire Dept.
201 Lysle Blvd.
McKeesport 15132
(412) 675-5021

Pittsburgh Fire Dept.
100 Grant St.
Pittsburgh 15219
(412) 255-2860

Reading Bureau of Fire
8th & Washington Sts.
Reading 19601
(215) 376-4277

Rhode Island

Barrington Fire Dept.
R3 Rumstick Rd.
Barrington 02806
(401) 245-3108

Tennessee

Johnson City Fire Dept.
515 E. Main St.
Johnson City 37601
(615) 282-6323

Nashville Fire Dept.
500 2nd Ave., N.
Nashville 37201
(615) 259-5423

Texas

Abilene Fire Dept.
140 Mulberry St.
Abilene 79601
(915) 676-6413

Austin Fire Dept.
P.O. Box 1088
Austin 78767
(512) 443-9403

Baytown Fire Dept.
307 S. Main
Baytown 77520
(713) 424-7414

College Station Fire Dept.
P.O. Box 9960
College Station 77840
(713) 696-8280

Corpus Christi Fire Dept.
1401 Morgan St.
Corpus Christi 78404
(512) 884-8854

Dallas Fire Dept.
1500 Marilla
Dallas 75201
(214) 670-4615

Denton Fire Dept.
217 W. McKenney
Denton 76201
(817) 566-8149

Forest Hills Fire Dept.
P.O. Box 15330
Fort Worth 76119
(817) 531-1043

Galveston Fire Dept.
2514 Sealy Ave.
Galveston 77550
(713) 766-2145

Houston Fire Dept.
410 Bagby
Houston 77002
(713) 222-3964

Hurst Fire Dept.
2100 Precinct Line Rd.
Hurst 76053
(817) 634-3131

Killen Fire Dept.
201 N. 28th St.
Killen 76541
(817) 634-3131

Laredo Fire Dept.
One Guadelupe
Laredo 78040
(512) 722-7504

Port Authur Fire Dept.
P.O. Box 1089
Port Arthur 77640
(713) 985-5591

Texas City Fire Dept.
914 5th Ave., N
Texas City 77590
(713) 945-4468

Vermont
Hartford Fire Dept.
V.A. Cutoff Rd.
White River Junction 05001
(802) 295-3232

Virginia
Arlington County Fire Dept.
1020 N. Hudson St.
Arlington 22210
(703) 558-2901

Fairfax County Fire & Rescue
4031 University Dr.
Fairfax 22030
(703) 691-2126

Henrico Fire Department
P.O. Box 27032
Richmond 23273
(804) 541-2310

Norfolk Fire Dept.
540 E. City Hall Ave.
Norfolk 23510
(804) 441-2171

Petersburg Fire Dept.
3321 Johnson Rd.
Petersburg 23803
(804) 733-3951

Richmond Fire Dept.
501 N. 9th St.
Richmond 23219
(804) 427-4228

Virginia Beach Fire Dept.
Public Safety Bldg.
Virginia Beach 23456
(804) 427-4228

Washington
Bellevue Fire Dept.
P.O. Box 1768
Bellevue 98009
(206) 537-8530

Olympia Fire Dept.
108 W. State St.
Olympia 98501
(206) 753-8348

Parkland Fire Dept.
100 S. 114th
Tacoma 98444
(206) 537-8530

Port of Seattle Fire Dept.
2400 S. 170th St.
Seattle 98158
(206) 433-5327

Seattle Fire Dept.
301 Second Ave., S
Seattle 98104
(206) 623-2748

Tacoma Fire Dept.
901 Fawcett Ave.
Tacoma 87402
(206) 593-4433

Wisconsin
Allouez Fire Dept.
135 Dauphin St.
Green Bay 54301
(414) 437-1783

Kenosha Professional Fire Fighters
1625 Sherman Rd., #5
Kenosha 53104
(414) 551-8118

Madison Fire Dept.
1602 S. Park St.
Madison 53715
(608) 266-4428

Wausau Fire Dept.
Grand Ave. and Thomas St.
Wausau 55401
(715) 756-6244

Source: *Management of the Entry of Women in the Fire Service: A Directory of Resources*, FEMA, 1982.

Recruiting Programs for Women

Fire departments with programs for recruiting qualified women are listed alphabetically in this section. Undoubtedly, a well-planned and well-executed recruitment program will produce the best qualified women for selection. The United States Fire Administration has made available (through FEMA) *Managing the Entry of Women and Minorities*, a personnel management handbook on the legal issues associated with recruiting, hiring, and training women fire fighters. The manual contains in-depth guidelines about the process and techniques of an effective recruiting campaign.

Departments with Recruiting Programs

Arizona

Phoenix Fire Dept.
2430 S. 22nd Ave.
Phoenix 85009
(602) 262-6393

California

Fountain Valley Fire Dept.
10200 Alater Ave.
Fountain Valley 92708
(714) 963-8321

Inglewood Fire Dept.
1 Manchester Blvd.
Inglewood 90301
(213) 649-7350

Palo Alto Fire Dept.
250 Hamilton
Palo Alto 94305
(514) 329-2102

Sacramento Fire Dept.
3101 Stockton Blvd.
Sacramento 95820
(916) 449-5366

San Diego Fire Dept.
1222 First Ave.
San Diego 92101
(714) 236-5509

Santa Ana Fire Dept.
1439 S. Broadway
Santa Ana 92701
(714) 834-4112

Watsonville Fire Dept.
105 2nd St.
Watsonville 95076
(408) 728-6060

Connecticut

New Haven Fire Dept.
952 Grand Ave.
New Haven 06511
(203) 787-6300

Willimantic Fire Dept.
13 Bank St.
Willimantic 06226
(203) 423-2642

Washington, DC

District of Columbia Fire Dept.
438 Massachusetts Ave., NW
Washington, DC 20001
(202) 745-2347

Florida

Jacksonville Fire Dept.
107 Market St.
Jacksonville 32202
(904) 633-5430

Miami Beach Fire Dept.
2300 Pine Tree Dr.
Miami Beach 33149
(305) 673-7179

Seminole Fire Dept.
11195 70th Ave.
Seminole 33542

Georgia

Cobb County Fire Dept.
P.O. Box 7237
Marietta 30065
(404) 427-5334

Illinois

Evanston Fire Dept.
732 Madison
Evanston 60202
(312) 866-5900

Rockford Fire Dept.
204 S. First St.
Rockford 61104
(815) 987-5668

Indiana

Ft. Wayne Fire Dept.
1 Main St.
Ft. Wayne 46802
(219) 423-7011

Indianapolis Fire Dept.
555 N. New Jersey St.
Indianapolis 46204
(317) 923-2815

Maryland
Prince Georges County Fire Dept.
Room 2132, County Admn. Bldg.
Upper Marlboro 20870
(301) 952-4728

Michigan
Detroit Fire Dept.
250 W. Larned St.
Detroit 48226
(313) 224-2035

Missouri
Independence Fire Dept.
103 N. Main St.
Independence 64050
(314) 254-3211

Kansas City Fire Dept.
414 E. 22nd St.
Kansas City 64108
(816) 531-2121

New Jersey
Jersey City Fire Dept.
8 Erie St.
Jersey City 07302
(201) 547-4240

Newark Fire Dept.
1010 18th Ave.
Newark 07106
(201) 733-7426

New York
White Plains Fire Dept.
221 Mamaroneck Ave.
White Plains 10601
(914) 949-6303

North Carolina
Charlotte Fire Dept.
125 S. Davidson St.
Charlotte 28205
(704) 374-2130

Texas
Dallas Fire Dept.
1500 Marilla
Dallas 75201
(214) 670-4615

Virginia
Alexandria Fire Dept.
301 King St.
Alexandria 22314
(703) 750-6444

Arlington County Fire Dept.
1020 N. Hudson St.
Arlington 22201
(703) 558-2485

Washington
Port of Seattle Fire Dept.
2400 S. 170th St.
Seattle 98158
(206) 433-5327

Seattle Fire Dept.
301 Second Ave., S
Seattle 98104
(206) 623-2748

West Virginia
Huntington Fire Dept.
839 7th Ave.
Huntington 25701
(304) 696-5950

Wisconsin
Madison Fire Dept.
1602 S. Park St.
Madison 53715
(608) 266-4428

Milwaukee Fire Dept.
711 W. Wells St.
Milwaukee 53233
(414) 276-5656

Source: *Management of the Entry of Women in the Fire Service: A Directory of Resources*, FEMA, 1982. Data obtained from a series of national seminars and an IAFF assessment on women in the fire service.

THE DALLAS RECRUITMENT PROGRAM

Would your department like to increase the likelihood of recruiting women physically capable? The Dallas Fire Department did by stategically designing a recruiting program to seek out women who already possessed a high degree of physical fitness, thereby increasing the probability of successful completion of recruit training. Dallas recruiting officers target large educational institutions in various Texas cities and occasionally in other states. In their visits to these campuses, recruiters focus on physical education departments, nursing departments, and women's athletic teams, since these areas may yield a high percentage of women capable of learning and performing fire fighting skills. Today, Dallas employs 14 female fire fighters/paramedics in its fire department.

Physical Performance Testing

It is a proven fact that fire fighting requires above average levels of physical fitness. The strenuous nature of the job and the heavy liability assumed by the fire department in the financial protection of fire fighters demand strict screening of potential candidates for physical ability.

The physiological differences between male and female candidates, especially in muscular strength, mean that more women than men fail the physical performance evaluation during fire fighter selection. As a result of this situation, a physical performance evaluation that is valid and job-related is mandatory. Whether or not the candidate will successfully complete recruit school to become a competent rookie fire fighter should be the intent of the evaluation, and should be determined in the least discriminatory way. Therefore, a department's physical performance exam should be examined to ensure it is valid and job-related. Tests that are unquestionably based on the requirements of the job are also more likely to be upheld in court, should they be contested.

Experience has shown that, regarding the hiring of female fire fighters, standards should not be artificially raised or lowered. Rather, standards should be designed to realistically select the most-qualified candidates. Fire departments that have had experience designing and applying physical performance tests are listed in this section.

Departments with Experience in Designing Physical Performance Evaluations

Arizona
Phoenix Fire Dept.
2430 S. 22nd Ave.
Phoenix 85009
(602) 262-6393

Tucson Fire Dept.
P.O. Box 27210
Tucson 85726
(602) 791-4511

California
Fountain Valley Fire Dept.
19200 Slater Ave.
Fountain Valley 92708
(714) 963-8321

Sacramento Fire Dept.
3101 Stockton Blvd.
Sacramento 95820
(916) 449-5366

San Diego Fire Dept.
1222 First Ave.
San Diego 92101
(714) 236-5509

Santa Ana Fire Dept.
1439 S. Broadway
Santa Ana 92701
(714) 834-4112

Connecticut
Willimantic Fire Dept.
13 Bank St.
Willimantic 06226
(203) 423-2642

Florida
Miami Fire Dept.
P.O. Box 330708
Miami 33133
(305) 579-6300

Tampa Fire Dept.
808 Zack St.

Tampa 33602
(813) 223-8171

Illinois
Rockford Fire Dept.
204 S. First St.
Rockford 61104
(815) 987-5668

Indiana
Fort Wayne Fire Dept.
1 Main St.
Fort Wayne 46802
(219) 423-7011

Indianapolis Fire Dept.
555 N. New Jersey St.
Indianapolis 46204
(317) 923-2815

Pike Township Fire Dept.
P.O. Box 68300
Pike Township 46268
(317) 299-0424

Massachusetts
Lexington Fire Dept.
45 Bedford St.
Lexington 02173
(617) 862-0500

Maryland
Prince Georges County Fire Dept.
Room 2132, County Admn. Bldg.
Upper Marlboro 20870
(301) 952-4728

Michigan
Detroit Fire Dept.
250 W. Larned St.
Detroit 48226
(313) 224-2035

Missouri
Independence Fire Dept.
103 N. Main St.
Independence 64050
(314) 254-3211

New Jersey
Jersey City Fire Dept.
8 Erie St.
Jersey City 07302
(213) 547-4240

Ohio
Fostoria Fire Dept.
233 W. South St.
Fostoria 44830
(419) 435-3206

Oregon
Albany Fire Dept.
110 S.E. 6th Ave.
Albany 97321
(503) 967-4340

Texas
Dallas Fire Dept.
1500 Marilla
Dallas 75201
(214) 670-4615

El Paso Fire Dept.
600 E. Overland St.
El Paso 79901
(915) 532-2444

Virginia
Alexandria Fire Dept.
301 King St.
Alexandria 22314
(703) 750-6444

Arlington County Fire Dept.
1020 N. Hudson St.
Arlington 22210
(703) 558-2485

Fairfax County Fire Dept.
4031 University Dr.
Fairfax 22030
(703) 691-2126

Washington
Port of Seattle Fire Dept.
2400 S. 170th St.
Seattle 98158
(206) 433-5327

Seattle Fire Dept.
301 Second Ave. S
Seattle 98104
(206) 623-2748

Spokane Fire Dept.
W. 44 Riverside
Spokane 99207
(509) 456-2694

West Virginia
Huntington Fire Dept.
839 7th Ave.
Huntington 25701
(304) 696-5950

Wisconsin
Madison Fire Dept.
1602 S. Park St.
Madison 53715
(608) 266-4428

Source: *Management of the Entry of Women in the Fire Service: A Directory of Resources*, FEMA, 1982.

Recruit Training

One of the most critical steps in effectively managing the entry of women into the fire service is a department's first co-ed recruit training class. As in all phases of a department's affirmative action program, management's commitment to the entry of women is essential for the success of the recruit training program.

A fire department that has the following components is unlikely to have difficulties with the management of female recruits:

- A carefully planned training program.
- Commitment to affirmative action from the administration to the training personnel.
- Adequate and enforceable policies on discrimination (policies should be familiar to training personnel and thoroughly explained to recruits).
- Thorough documentation procedures. (It is impossible to over-document training activities that may be challenged.)

This section contains an alphabetical listing by state of fire departments where recruit training programs have contributed to the successful performance of women in the fire service. For further information on recruit training of female fire fighters, consult the manual *Managing the Entry of Women and Minorities* available from FEMA.

Departments with Experience in Training the Pre-training Programs Facilitating the Entry of Qualified Women

Arizona
Phoenix Fire Dept.
2430 S. 22nd Ave.
Phoenix 85009
(602) 262-6393

California
Oakland Fire Dept.
1330 Grove St.
Oakland 94612
(415) 444-3322, Ext. 22

San Diego Fire Dept.
1222 First Ave.
San Diego 92101
(714) 236-5509

Connecticut
Willimantic Fire Dept.
13 Bank St.
Willimantic 06226
(203) 423-2642

Illinois
Rockford Fire Dept.
204 S. First St.
Rockford 61104
(815) 987-5668

New Jersey
Jersey City Fire Dept.
8 Erie St.
Jersey City 07302
(201) 547-4240

New York
White Plains Fire Dept.
221 Mamaroneck Ave.
White Plains 10601
(914) 949-6303

Ohio
Fostoria Fire Dept.
233 W. South St.
Fostoria 44830
(419) 435-3206

Oklahoma
Oklahoma City Fire Dept.
820 N. West 5th St.
Oklahoma City 73112
(405) 947-0771

Oregon
Portland Fire Dept.
55 S.W. Ash
Portland 97204
(503) 248-4375

Texas
Dallas Fire Dept.
1500 Marilla
Dallas 75201
(214) 670-4615

Washington
Port of Seattle Fire Dept.
2400 S. 170th St.
Seattle 98158
(206) 433-5327

Seattle Fire Dept.
301 Second Ave. S
Seattle 98104
(206) 623-2748

Tacoma Fire Dept.
901 Fawcett Ave.
Tacoma 98402
(206) 593-4433

West Virginia
Huntington Fire Dept.
839 7th Ave.
Huntington 25701
(304) 696-5950

Source: *Management of the Entry of Women in the Fire Service: A Directory of Resources*, FEMA, 1982.

Protective Clothing

Fire departments are obligated to provide a safe and hazard-free work environment for personnel, wherever possible. To assist in the search for turnout gear that fits female fire fighters, a survey was conducted on the range of sizes for turnout pants and coats, gloves, safety shoes and boots. There is at least one manufacturer in each category that has a specialized line for women. In all cases, the buyer must determine if the specific product in question meets the appropriate standard for fire fighter protective clothing. The results of the survey are included in this section.

Major Anti-Discrimination Laws and Regulations

Presented here are brief summaries of 12 key anti-discrimination and equal employment opportunity laws, regulations, and other federal directives which may have a direct or indirect relationship to the recruitment, evaluation, hiring, training, and promotion of women fire fighters.

1. The Fourteenth Amendment. This amendment to the U.S. Constitution's Bill of Rights opened the way for the case-by-case civil rights efforts that culminated in the Civil Rights Act of 1964 and the EEO Act of 1972.

The Fourteenth Amendment provides that no state or local government shall deny any person equal protection of law or due process of law. It applies to all activities of all state and local governments — including their role as employers. In addition to other obligations that are, strictly speaking, outside the EEO sphere, it requires that state and local governments provide equal employment opportunity.

Unlike virtually every law designed to guarantee equal employment opportunity, the Fourteenth Amendment subjects to scrutiny *all* distinctions made among various employees or applicants for employment by a state or local government employer, to see if unconstitutional discrimination exists. This is in contrast to Title VII of the Civil Rights Act of 1964, which applies only to discrimination based on race, color, religion, sex, or national origin. The Fourteenth Amendment thus applies to kinds of employment discrimination not covered by Title VII. For example, it has been held unlawful by the courts to prohibit job discrimination because of homosexuality, alienage, and political beliefs.

The key difference between the Fourteenth Amendment and anti-discrimination laws like Title VII is that *intent to discriminate* is required for a violation of the Fourteenth Amendment. In its decision in *Washington* v *Davis*, the Supreme Court held that a city police department prehire test that had the effect of excluding a greater percentage of blacks than whites did not violate the Fourteenth Amendment because the city did not intend to discriminate against blacks.

2. Wagner-Peyser Act of 1933. This Act and its interpretative regulations prohibit discrimination on the basis of race, creed, color, or national origin. The regulations contain a policy statement promoting equal opportunity on the basis of sex. This Act applies to the operations of state employment services and unemployment insurance agencies.

3. The National Apprenticeship Act of 1937. This Act provides that apprenticeship programs registered with state agencies or the U.S. Department of Labor may not discriminate in the recruitment, selection, employment, and training of apprentices on the basis of race, color, religion, national origin, or sex.

FIRE FIGHTER TURNOUT GEAR

Company	Range of Size		Proximity Suit	Chemical Suit	Custom Made
	Pants	Coats			
Alb, Inc. 366A Somerville Ave. Somerville, MA 02143 (617) 666-8126	26–48	32–56	NO	YES-Coat 32–56 + Overall	YES
Body-Guard by Survivair Div. U.S. Divers 3323 W. Warner Ave. Santa Ana, CA 92702 (714) 540-8010	26–56 24–36 long	34–58 34–48 long	NO	S/M/L/X	YES
Cairns and Brother/ Midwestern 60 Webro Rd. Clifton, NJ 07012 (201) 473-5867	EVERYTHING CUSTOM MADE TO ORDER				
Fyrepel Products, Inc. PO Box 518 Newark, OH 43055 (614) 344-0391	30–44	34–56	YES	YES	YES
	Also Fabric				
Globe Mfg. Co. Loudon Rd. Pittsfield, NH 03263 (603) 435-8323	EVERYTHING CUSTOM MADE TO ORDER				
Goodall Rubber Co. PO Box 8237 Trenton, NJ 08650 (609) 587-4000 (301) 525-1555	36–54	36–54	NO	YES All Sizes	YES
Janesville Apparel 2735 Kearns Ave. Dayton, OH 45414 (513) 278-5465	30–44	36–54	NO	NO	YES
Mine Safety Appliances Co. 600 Penn Center Blvd. Pittsburgh, PA 15235 (412) 273-2683	28–50	36–48	NO	Small 5′7″–6′3″	YES
Morning Prida Mfg. Co. 1985 Home Ave. Dayton, OH 45417 (513) 263-2683	EVERYTHING CUSTOM MADE TO ORDER				
Red Kap Industries 749 Massman Dr. Nashville, TN 37210 (615) 889-6800	28–46	Sm-XXL	NO	YES	YES (+ Charge)
Wheeler Protective Apparel, Inc. 1330 W. Belmont Ave. Chicago, IL 60641 (812) 685-5551	NO	NO	S–XL 38–50	38–50	YES

Source: *Management of the Entry of Women in the Fire Service: A Directory of Resources*, FEMA, 1982.

GLOVES

Company	Range of Size
Cairns and Brother, Inc./Midwestern 60 Webro Rd. Clifton, NJ 07012 (201) 473-5867	Medium
Firecraft Div/Western Fire Equipment Co. P.O. Box 968E Wooster, OH 44691 (216) 264-6274	S, M, L, XL
Fyrepel Products, Inc. P.O. Box 518 Neward, OH 43055 (614) 344-0391	S, M, L
Globe Mfg. Co. Loudon Rd. Pittsfield, NH 03263 (603) 435-8323	Universal Large
Janesville Apparel 2735 Kearns Ave. Dayton, OH 45414 (513) 278-5465	S, M, L Special order for XS and XL
Mine Safety Appliances Co. 600 Penn Center Blvd. Pittsburgh, PA 15235 (412) 273-5000	L
Morning Pride Mfg. Co. 1985 Home Ave. Dayton, OH 45417 (513) 263-2683	S, M, L, XL
Tempo Glove Mfg. Inc. 3820 West Wisconsin Ave. Milwaukee, WI 53206 (414) 344-1100	S (Women's) M, L, XL
Western Fire Equipment Co. 440 Valley Dr. Brisbane, CA 94005 (415) 467-5650	S, M, L, XL
Wolverine World Wide 9341 Courland Dr. Rockford, MI 49351 (616) 698-7220	X, M, L, X

Source: *Management of the Entry of Women in the Fire Service. A Directory of Resources*, FEMA, 1982.

FIRE FIGHTER SAFETY SHOES

Company	Range of Size		Custom Made
	Men	Women	
Hy-Test Safety Shoes Div. of Interco. Company PO Box 144885 St. Louis, MO 63178 (314) 342-7000	B8-12, 13 C7-12, 13 D6-12, 13 E6-12, 13 EEE6-12	N.A.	YES
Lehigh Safety Shoe Co. Div. of Endicott-Johnson Prod. 1100 E. Main St. Endicott, NY 13760 (800) 847-9371	A, B9-12 C 8-12 D6-12, 13 E, EEE7-12, 13	A, AA, AAA5-11 B, C4-11 D, E5-11	YES
Chippawaugh Shoe Co. Chippawaugh Falls, WI 54729 (715) 723-5571	C9-2, 13 D7-12, 13, 14 E7-12, 13 EE7-12, 13	N.A.	
Iron Age Shoe Co. 2406 Woodmere Dr. Pittsburgh, PA 15205 (412) 522-7005	AA4-15 A B C D E EEE	AA4-11 B E EE	

Source: *Management of the Entry of Women in the Fire Service, A Directory of Resources,* FEMA, 1982.

4. The Civil Rights Act of 1957. This Act established the U.S. Commission on Civil Rights. It was amended in October 1972 to extend the Commission's jurisdiction to include sex discrimination, in addition to discrimination on the basis of race, religion, color, or national origin.

The function of the Commission is purely investigatory and fact-finding. It does not adjudicate and it cannot take any affirmative action which will affect an individual's legal rights. Its fact-finding results may be used as a basis for judicial, legislative, or executive action.

The Commission serves as a national clearinghouse for information regarding denials of equal protection of the laws on the basis of race, color, religion, sex, or national origin. As such, it publishes a wide variety of materials pertaining to the civil rights of minorities and women.

5. The Equal Pay Act (1963). This Act amended the Fair Labor Standards Act of 1938 (which established a federal minimum wage, overtime pay, and child labor laws) to include a prohibition against pay differentials based on sex. All businesses that must pay employees minimum wage are prohibited from discriminating on the basis of sex in determining wages for workers. *The Education Amendments of 1972* extend the Equal Pay Act to include previously uncovered executive, administrative, and professional workers (including academic personnel).

The Act forbids any employer who must pay employees at least minimum wage from determining wages for workers on the basis of sex. Exceptions are allowed if it can be shown that the wage differential is based on a seniority or merit system, a system

FIRE FIGHTER BOOTS

Company	Range of Size	
	Men	Women
Fyrepel Products, Inc. P.O. Box 518 Newark, OH 43055 (614) 344-0391	5–14	N.A.
Goodall Rubber Co. P.O. Box 8237 Trenton, NJ 08650 (609) 587-4000	6–14	5–11
Ranger Rubber Company 1100 E. Main St. Endicott, NY 13760 (607) 757-4260	6–13 (M)	5–11
Servus Rubber Co. P.C. Box 36 Rock Island, IL 61201 (309) 786-7741	5–14	N.A.
Uniroyal, Inc. Benson Rd. Middlebury, CT 06749 (203) 573-3000	5–14 (M)	N.A.

Source: *Management of the Entry of Women in the Fire Service, A Directory of Resources*, FEMA, 1982.

measuring earnings by quantity or quality of production, or on any other factor other than sex.

To involve "equal work" under the Equal Pay Act, jobs need not be identical, but only substantially equal. Whether work is substantially equal is determined by comparing the skill, effort, and responsibility required in the jobs and the working conditions under which they are performed. Thus, job content and not job title is determinative. For example, job titles such as "clerk" or "stock clerk" are so general in nature and may include such a variety of different duties that different employees with the same title may nevertheless be found to be performing substantially unequal work under the Act. Conversely, jobs that are given different titles or different point values may be deemed equal under the statute.

A contractor must also review all benefits and conditions of employment to see that they are equally available without discrimination to all employees, male and female. This includes medical, hospital, accident and life insurance; retirement benefits; pension, profit-sharing and bonus plans; leave; and other terms, conditions, and privileges of employment.

6. Title VI of the Civil Rights Act of 1964. This Act has been broadly construed to prohibit employment discrimination. It expressly prohibits discrimination where the primary object of federal assistance is to provide employment. In addition, it has been construed by the courts to prohibit employment discrimination under other types of programs, because employment discrimination might disadvantage the intended beneficiaries of those programs. In net effect, then, Title VI applies to the employment practices of virtually every recipient of federal funds.

Title VI does not preempt other anti-discrimination laws. A state or local government employer subject to Title VI because it is receiving federal funding may also be subject to EEO requirements of the specific federal law under which the funds are received. In addition, it remains subject to the Fourteenth Amendment and other anti-discrimination laws such as the Civil Rights Acts and the Equal Pay Act.

Moreover, it has been held that the prohibition of discrimination contained in Title VI does not prevent the imposition of affirmative action requirements under other laws, orders, or regulations.

Title VI makes those federal agencies which distribute funds to state and local governments responsible for enforcing its nondiscrimination provision, and authorizes each agency to issue regulations to carry out this responsibility. These regulations apply only to federal assistance programs that have as their primary goal providing employment. However, as noted above, the courts have expanded Title VI to cover other programs where beneficiaries would be disadvantaged by employment discrimination, and these regulations might be extended to cover such situations.

7. Title VII Civil Rights Act of 1964. This Act specifically addresses itself to equal employment opportunity. Title VII prohibits discrimination in employment based on sex as well as race, color, religion, or national origin. The Act makes it unlawful to discriminate in hiring or firing; wages; fringe benefits; classifying, referring, assigning, or promoting employees; extending or assigning facilities, training, retraining, or apprenticeships; or any other terms, conditions, or privileges of employment. As amended in 1972, Title VII covers most employers of 15 or more employees, public and private employment agencies, labor unions with 15 or more members, and joint labor-management committees for apprenticeships and training. Indian tribes are exempt as employers. Religious institutions are exempt with respect to employing persons of a particular religion, but are covered with respect to discrimination based on sex, race, color, or national origin.

Originally, Title VII did not apply to state and local government employers. In 1972 it was amended to cover all such public employers having at least 15 workers for 20 or more calendar weeks per year. However, exempted from coverage are elected officials and their personal assistants and immediate advisors.

Title VII does permit employers to discriminate on the basis of religion, sex, or national origin (but not race or color) only if sex, religion, or national origin can be shown to be bona fide occupational qualifications. To be "bona fide," an occupational qualification must be necessary, not simply convenient, for the normal operation of the employer's business. This exception is rarely granted.

The Equal Employment Opportunity Commission (EEOC) will investigate where a complaint has been made or, on some occasions, where there are other indications that employment discrimination exists. After EEOC has found reasonable cause to believe that discrimination exists, the Commission informally attempts to bring the party for the discriminatory practices into compliance with Title VII.

The Commission, however, may order the employer to cease its discriminatory practices, to reinstate employees, to pay back wages, and to take other appropriate affirmative action to eliminate existing discrimination and prevent its recurrence.

8. Executive Order 11246 (1965). As amended, this order prohibits employment discrimination on the basis of race, color, religion, national origin, or sex in institutions or agencies with federal contracts of over $10,000. Relevant contracts include contracts for direct services and grants which involve a benefit to the federal government. Institutions or agencies covered under this Executive Order must observe non-discriminatory practices in hiring, discharge, promotion, wages, benefits, training, and all other conditions of employment.

Those institutions or agencies with federal contracts or grants of $50,000 or more and fifty or more employees are required to develop written affirmative action plans to overcome actively the effects of past discrimination, and to facilitate optimal utilization of qualified women and minorities throughout the work force. An affirmative action plan must contain a work force utilization analysis to identify those areas in which women and minorities are under-utilized, a review of all employment policies and practices to identify and to eliminate any sources of discrimination, and a statement of numerical goals and timetables for the correction of any identified under-utilization. Although the contract may involve only one unit within the institution, the affirmative action plan must cover all employees throughout the institution.

9. The Intergovernmental Personnel Act of 1970. This Act is designed to encourage the development of state and local government personnel merit systems, by requiring agencies or programs of state and local governments that receive grants-in-aid from a federal agency to develop and implement such systems.

State or local government units receiving funds covered by the Act are prohibited, by regulation, from discriminating on the basis of race, national origin, political, or religious affiliation or opinions, age, sex, physical disability, or any other characteristic which is unrelated to merit, unless it is a bona fide occupational qualification.

The United States Office of Personnel Management (formerly the Civil Service Commission) administers the Act. The OPM may recommend remedial action if the program fails to comply with the provisions under the Act, including termination of grants to state and local governments after they have been given reasonable notice and an opportunity for a hearing. However, actual enforcement authority rests with the grantor agency.

10. The Equal Employment Opportunity Act of 1972. This Act is an amendment to the Civil Rights Act of 1964 which adds sex and religion to the Title VII portion, and extends Equal Employment Opportunity (EEO) to state, local and municipal organizations, all employment agencies (private and public), and to labor organizations. This act empowers EEOC to bring civil action against any organization which is alleged to be practicing discrimination. The Act also gives individuals the right to take a complaint directly to a court of law.

11. The State and Local Fiscal Assistance Act of 1972. This Act provides funds to states, counties, townships, municipalities (and other local governments), Indian tribes, and Alaskan native villages for public safety, environmental protection, public transportation, health, recreation, libraries, social services for the poor or aged, financial administration, and other expenditures.

This Act, which is administered and enforced by the Director of the Office of Revenue Sharing, prohibits discrimination on the basis of race, color, national origin, sex, age, religion, or handicap in any program or activity receiving funds under the Act.

12. The Comprehensive Employment and Training Act of 1973. This Act establishes a decentralized system of federal, state, and local government programs to provide job training and employment opportunities for economically disadvantaged, unemployed, and underemployed persons. These programs may be sponsored by a state, a unit of local government, or an employment program serving a rural area with a high level of unemployment.

Any job training program that receives funds through this act may not discriminate on the basis of race, color, creed, national origin, sex, political affiliation, or beliefs. This prohibition also covers anyone who contracts or subcontracts with any funded program, as well as anyone who works with such a program by agreement.

If the Secretary of Labor determines that a recipient is discriminating, the Secretary must attempt to secure voluntary compliance. If this attempt is unsuccessful, the Secretary may terminate assistance, refer the matter to the United States Attorney General for institution of a civil suit, invoke the provisions of Title VI, or seek enforcement by other means. Moreover, a court has held that this law's EEO requirements may be enforced by a suit by a private individual.

Source: *Management of the Entry of Women in the Fire Service: A Directory of Resources*, FEMA, 1982.

Organizations and Agencies

AFL/CIO
815 16th St., NW
Washington, DC 20006
Cynthia McCaughan, Coordinator of Women's Activities
(202) 638-4024

Clearinghouse on Women's Issues
Dupont Circle Bldg., Suite 924
1346 Connecticut Ave., NW
Washington, DC 20036
(202) 466-3429

Coalition of Labor Union Women
15 Union Square
New York, NY 10003
Joyce D. Miller, President
(202) 242-0700

Defense Advisory Committee on Women in the Services (DACOWITS)
Room 3D322, Pentagon
Washington, DC 20301
Sally Richardson, Committee Chair
(202) 697-5655

Federal Emergency Management Agency
United States Fire Administration
Washington, DC 20472

Fire Fighter Safety, Health, and Technology
Andrew Sears, Director
(202) 634-7660

Office of Planning and Education
Women in the Fire Service Program
Laura Buchbinder
(202) 634-7553

International Association of Fire Fighters
1750 New York Ave., NW
Washington, DC 20006
(Information and services available only to Principal Officers of IAFF Affiliates.)

Research Department
Michael Smith, Director
(202) 872-8484

Health and Safety Program
Richard Duffy, Program Director
(202) 872-8484

Labor Recruitment Program
Roscoe Hamby, Program Director
(202) 783-4777

Women in the Fire Service Program
Carol Vougioukles, Program Director
(202) 872-8484

Michigan Municipal League
Firefighter Selection Research Project
1675 Green Rd., Box 1487
Ann Arbor, MI 48106
James L. Wardlow, Project Manager
(313) 662-3246

United States Department of Justice
Civil Rights Division
521 12th St., NW, Room 408
Washington, DC 20530
(202) 724-6758

United States Department of Labor
Office of the Secretary
Women's Bureau
200 Constitution Ave. NW
Room S 3005
Washington, DC 20210
(202) 523-9330

Women's Occupational Health Research Center
School of Public Health
Columbia University
60 Haven Ave. B-1
New York, NY 10032
Dr. Jeanne Stellman, Executive Director

Publications, Reports, Articles about Women in the Fire Service

Publications and Reports
International Association of Fire Fighters
1750 New York Ave., NW
Washington, DC 20006

Discrimination and the Firefighter, (Available only to Principal Officers of IAFF Affiliates) (p. 213)

Management of the Entry of Women in the Fire Service: A Directory of Resources

Federal Emergency Management Agency/U.S. Fire Administration
Washington, DC 20472

Development of Job-Related Physical Performance Examinations for Firefighters
The Role of Women in the Fire Service
Report: *Symposium on Women in the Fire Service,* September 8-10, 1980, Vancouver, WA
Report: *East Coast Conference on Women in the Fire Service,* December 10-12, 1980, Washington, DC
Manual: *Fire Department Personnel Management Handbook: Managing the Entry of Women and Minorities* (NTIS No. PB82227851)

Michigan Municipal League
Firefighter Selection Research Project
1675 Green Rd., Box 1487
Ann Arbor, MI 48106

Fire Fighter Selection Project Implementation Manual
Entry-Level Oral Examination
Job Analysis of the Entry-Level Firefighter Position (Vol. I)
Fire Fighter Physical Performance Test (Vol. II)
Firefighter Selection Interview Procedures (Vol. III)
Written Examination Development (Vol. IV)
Pre-employment Inquiries, Minimum Qualifications, Background Investigation (Vol. V)

Equal Employment Opportunity Commission
2401 E St., NW
Washington, DC 20506
(or see local telephone directory listing under U.S. Government)

A Directory of Resources for Affirmative Recruitment, (91 pages), 1975.
Guidelines on Discrimination Because of Sex, 1972.

U.S. Department of Commerce
Bureau of the Census
Washington, DC 20233

A Statistical Portrait of Women in the U.S., Special Studies, Series P-23 No. 58, (90 pages), 1976.
Women in Apprenticeship—Why Not?, R & D Monograph No. 33, (34 pages), 1976.

U.S. Department of Labor
Women's Bureau
Washington, DC 20210

Most Women Work Because of Economic Need, (chart), 1977.
Steps to Opening Skilled Traces to Women, (8 pages), 1974.
Trends in Women's Employment and Training in Selected Professions, (4 pages), 1976.
Women Workers Today, (10 pages), 1976.
A Working Woman's Guide to Her Job Rights, (34 pages), 1975, $.65.

CAREERS/JOB OPTIONS

Job Options for Women in the 80's, Pamphlet 18, (22 pages), 1980.
Women in Apprenticeship . . . There's a Future in It! Leaflet 58, Folder, 1980.
A Women's Guide to Apprenticeship, Pamphlet 17, (30 pages), 1980, $2.25.
Searching for a Job in the Construction Industry; Some Tips for Women, (5 pages), 1979.

Bibliography on Women in Apprenticeship, (1 page), 1979.

Women in Nontraditional Employment—A Selected List of Publications, Slides, and Films, (7 pages), 1979.

Sources of Assistance for Recruiting Women for Apprenticeship Programs and Skilled Nontraditional Blue-Collar Work, (6 pages), 1978.

Women in Nontraditional Jobs: A Program Model

Boston: *Nontraditional Occupations Program for Women*, (79 pages), 1978, $2.50.

Denver: *Better Jobs for Women*, (60 pages), 1978.

Women in Nontraditional Jobs: A Conference Guide—Increasing Job Options for Women, (32 pages), 1978, $1.60.

STANDARDS AND LEGISLATION AFFECTING WOMEN

Brief Highlights of Major Federal Laws on Sex Discrimination in Employment, (6 pages), 1980.

A Working Woman's Guide to Her Job Rights, Leaflet 55, 1979, $1.60.

Ban Against Pregnancy Discrimination, (2 pages), 1979.

New Regulations to Help Open Nontraditional Jobs to Women. Consumer Information Leaflet, (2 pages), 1978. (An explanation of the Department of Labor's new regulations on equal employment opportunity for minorities and women in the construction industry and in apprenticeship.)

State Labor Laws in Transition: From Protection to Equal Status for Women, Pamphlet 15, (20 pages), 1976, $.35. (Addendum through 1978 available from the Women's Bureau.)

Maternity Leave, Consumer Information Leaflet, (1 page), 1980.

Measures Providing Protection Against Sex Discrimination in Employment, Consumer Information Leaflet, (2 pages), 1980.

The Legal Status of Women. Reprint from *The Book of the States*, 1980-81. (11 pages). (Includes charts on marriage and divorce laws as of December 31, 1979.)

SLIDES

On a Typical Day . . . FEMA/USFA/OPE Washington, DC 20472. Shows variety of career options available for women in the fire service.

Destroying the Myths. EEOC Audio-Visual Division, Room 3200, Columbia Plaza, 2401 E St., NW, Washington, DC 20506 (202) 634-6930. Reviews employer equal opportunity responsibilities (10 minutes).

Order Section, National Audio-Visual Center (NAC)
General Services Administration
Washington, DC 20409

The Legal Rights of Women Workers. Expresses women's rights to equal employment opportunity, equal training and promotion opportunity, and equal pay. (NAC#-007847, $12, 6 minutes).

Legal Responsibilities—Affirmative Action and Equal Employment. Illustrates legal responsibilities of employers to eliminate unfair and illegal employment practices that often affect women. (NAC#-007848, $13.75, 12 minutes).

Articles

......."Women are Fire Fighters, too!," *Fire Command*, National Fire Protection Association, Boston, MA, Feb. 1976, pp. 16 - 19.

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Albertson, Mary V., "Equal Employment Opportunity and Affirmative Action in Fire Management," *Fire Management Notes*, U.S. Department of Agriculture Forest Service, Washington, DC, Winter, 1979-1980, pp. 3-6.

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Feldman, Danah, "Wildland Fire Fighting," *The International Fire Chief*, International Association of Fire Chiefs, Inc., Washington, DC, August, 1980, pp. 16-17.

Floren, Terese M., "Women Fire Fighters Speak," Parts I and II, *Fire Command*, National Fire Protection Association, Boston, MA, December, 1980, pp. 22-24, January, 1981, pp. 22-25.

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Roche, Diane C., "Public Fire Education," *The International Fire Chief*, International Association of Fire Chiefs, Washington, DC, August, 1980, p. 20.

Rudder, Beatrice, "Career Fire Fighting," *The International Fire Chief*, International Association of Fire Chiefs, Washington, DC, August, 1980, p. 16.

Stabiner, Karen, "The Storm Over Women Firefighters," *The New York Times Magazine*, September 26, 1982, pp. 100-107.

Stuller, Jay, "Hey, Lady! Where's the Fire?" *Readers Digest*, Reader's Digest, Inc., Pleasantville, NY, August, 1980, pp. 99-102.

Swartout, Robert, "Women Fire Fighters: The Seattle Concept," *The International Fire Chief*, International Association of Fire Chiefs, Washington, DC, August, 1980, pp. 10-11.

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Wardlow, Jim L., " The Challenge of Fire Fighter Selection, Michigan Offers a Solution," *The International Fire Chief*, International Association of Fire Chiefs, Washington, DC, May, 1981, pp. 19-21.

U.S. Forest Service Aviation Program

Scope

The Forest Service has the largest and one of the most varied aviation programs of any single U.S. Government agency except the three major military services. The total number of hours flown per year averages 100,000; about 75 percent fixed-wing and 25 percent helicopters. Most of the flying (about 65 percent) is in support of forest fire suppression and fire management programs.

A total aircraft fleet breakdown is approximately as follows:

Forest Service-owned	40
Forest Service-leased	25
Contract helicopter	115
Air tankers	48
Rental agreement light aircraft	250

Pilots and aviation managers employed by the Forest Service number about 105.

Complexity

Forest Service aviation operations include many types of missions:

- Fire detection patrols.
- Control of air tankers over fires (lead planes).
- Transportation of smokejumpers and paracargo in fixed-wing aircraft.
- Floatplane operations.
- Air tankers and helicopters dropping fire retardants.
- Transportation for Forest Service managerial technical and administrative personnel to remote locations in all weather conditions year-round.
- Land and wildlife management flights.
- Infrared sensing and mapping.
- Aerial photography.
- Research and development flying in connection with new technology including night operation of helicopters using "Night Vision Goggles," aerial ignition devices, and rappelling of persons into inaccessable areas. Air tanker tank and gating systems are tested, and infrared scanning and FLIR usage is under research.

These flying missions often involve a high degree of hazard:

- Steep mountainous terrain.
- High density altitudes.
- Low-level operations in turbulent air and poor visibility due to smoke.
- Congested airspace.
- Short back-country "one chance" airstrips.
- All weather operations year-round.

Forest Service aviation activities utilize the following types of aircraft:

- All common and standard general aviation aircraft ranging from Cessna 150s, 172s, 180s, 182s, supercubs and similar single-engine types; through Cessna, Beechcraft, Piper, Aero Commander and other light twin-engine planes; to DeHavilland, Twin Otter and Beaver, Beechcraft 99 and 58P, Douglas DC-3, Convair and Lockheed Electra transports.
- Restricted, standard and military category 2-, 3-, and 4-engine air tankers, including Grumman S2F, Douglas B-26, DC-6, and DC-7; Lockheed P2V, PV-2 and C-130; Fairchild C-119; Boeing B-17; and Consolidated-Vultee PB4Y-2.
- Light, medium and heavy helicopters ranging from three-place Bell 47G, Hiller SL-4, and Hughes 300 types; through turbine Bell Jet Rangers B-212s, and Hughes 500s, Alouette IIs, IIIs, and Lama's and Sikorsky's S-58Ts and also the largest Sikorsky S-61s, S-64 Skycrane and Vertol 107s.
- Sophisticated fixed-wing all-weather airplanes including Beechcraft King Air and Queen Air and Swearingen Merlin III planes equipped with cameras and infrared mapping equipment.

Qualifications for Pilots

In order to be considered fully qualified to fly Forest Service missions, individuals must have the following qualifications and experience:

- Possess a current, valid FAA unrestricted commercial pilot certificate (instrument rating — fixed-wing pilots) and appropriate aircraft rating.
- Possess a current, valid FAA second class medical certificate. After the fortieth birthday, evidence of an EKG examination indicating absence of myocardial infarction is also required with each medical certificate.

FLYING EXPERIENCE REQUIREMENTS

All Airplanes	Flying Hours
Total Time	1500
Pilot-in-Command Total	1200
Pilot-in-Command as follows:	
Category and class to be flown	200
Cross country	300
Operations in typical terrain (low level, mountainous, etc.)	200
Night	100
Instrument—actual/simulated	100
Make and model to be flown	25
Preceding 12 months	100
Preceding 60 days, all except air tanker	10
Heavy multi-engine fixed-wing (over 12,500 pounds weight)	
Multi-engine, pilot-in-command	250
In type, pilot-in-command, within past 5 years (Unrestricted FAA type rating for applicable airplane)	25
Helicopters	
Helicopter, pilot-in-command	1500
Weight class (light, medium, or heavy)	100
Turbine or reciprocating engine, as applicable	100
Make, model, and subsequent series	50
Make and model in preceding 60 days	10
Make and model in preceding 30 days	5
Typical terrain	200

Typical terrain experience requirement is: pilot experience in mountainous terrain with varying elevations of over 5000 feet pressure altitude at temperature ranges above 75°F, rugged peaks, deep canyons, cliffs, rock out-crops, steep slopes, mountaintop helispots, mountainside landing spots surrounded by trees, brush, or rocks; persistent wind, and weather which includes strong winds in the mountains and canyons with sudden up and down drafts and direction changes.

Pilots are hired from the Civil Service Register or from other government agencies. In order to meet standards of performance required, the Forest Service maintains a continuous training and upgrading program for its aviation personnel.

Future Outlook

There will be a continuing need for aircraft in support of fire suppression. This type of activity fluctuates according to severity of the fire season, but should average about the same number of hours. Administrative and project flying should increase at a small but steady rate.

The number of Forest Service-owned aircraft will remain static as old airplanes are excessed and new ones acquired. The pilot work force should remain about the same.

There will be more extensive use of contract aviation services, particularly "job" contracts such as helicopter logging, spraying and seeding.

The Forest Service will continue the policy of a high level of maintenance and upgrading aircraft, and adhering to standard skill and professionalism required for safety in our aviation operations.

Fire Protection/Fire Science Education

Colleges and universities that provide four-year degrees in the field of Fire Protection/Fire Science are listed below. The program at each school varies and may lead to an emphasis in fire protection engineering, fire technology. Fire science or fire administration and management students interested in any program should contact the schools directly to determine whether the course emphasis meets their career objectives.

The International Association of Fire Fighters administers a higher education program that provides opportunities for fire service personnel anywhere in the country to take upper level college courses for professional enrichment or as components of a baccalaureate degree. The program allows a student to enroll at a regional institution serving his/her state. All courses are in an independent study format that allows the student to study at home without mandatory classroom attendance. The Open Learning Courses cover the areas of fire administration and fire prevention technology.

The schools with an asterisk (*) after their name participate in the Open Learning Program. Further information can be obtained from:

Open Learning Fire Service Program
Dr. Betty Jo Mayeske
1750 New York Ave.
Washington, DC 20006
202-659-2067

Alabama
Troy State University
Troy 36081

California
California State University
Department of Industrial Studies
5151 State University Dr.
Los Angeles 90032

Cogswell College*
600 Stockton St.
San Francisco 94108

Connecticut
University of New Haven
300 Orange Ave.
West Haven 06516

Washington, DC
University of District of Columbia
4200 Connecticut Ave. NW
Washington 20008

Florida
Florida International University*
Tamiami Campus
Miami 33199

Illinois
Illinois Institute of Technology
3300 Federal St.
Chicago 60616

Lewis University
Route 53
Romeoville, IL 60441

Southern Illinois University
Carbondale Campus
Carbondale 62901

Western Illinois University*
Macomb 61455

Kansas
Wichita State University
Department of Industrial Engineering
Wichita 67203

Kentucky
Eastern Kentucky University
College of Law Enforcement
Richmond 40475

Maryland
University of Maryland*
College of Engineering
College Park 20472

Massachusettts
University of Massachusetts
Columbia Point
Boston 02125

Michigan
Madonna College
36600 School Craft Rd.
Livonia 48150

Minnesota
University of Minnesota*
77 Pleasant St. SE
Minneapolis 55455

Missouri
Central Missouri State University
School of Public Service
Warrensburg 64093

Mississippi
Jackson State University
Department of Industrial Technology
Jackson 39217

New Jersey
Jersey City State College
2039 Kennedy Blvd.
Jersey City 07305

New York
Empire State College*
State University of New York
2 Union Ave.
Saratoga Springs 12866

John Jay College of Criminal Justice
City University of New York
445 W. 59th Street
New York, NY 10019

Mercy College
555 Broadway
Dobbs Ferry 10522

Ohio
University of Cincinnati
College of Applied Science
100 East Central Park
Cincinnati 45210

Oklahoma
Oklahoma State University
301 Campus Fire Station
Stillwater 74074

University of Oklahoma*
Suite 226
1700 Asp Ave.
Norman 73037

Oregon
Western Oregon State College*
Monmouth 97361

Pennsylvania
Holy Family College
Grant and Frankfort Ave.
Philadelphia 19114

Rhode Island
Providence College
Providence 02918

Tennessee
Memphis State University*
University College
Memphis 38152

Texas
Texas A&M University
School of Industrial Technology
College Station 77840

Virginia
George Mason University
4400 University Dr.
Fairfax 22030

Washington
Central Washington University
Ellensburg 98926

The following colleges and universities offer programs in fire science/fire technology leading to a two-year degree. As with the four-year programs, no attempt has been made to define the specific emphasis of the programs between fire technology, fire science, or fire administration. Students should contact the schools directly to determine whether the course emphasis is in line with their career objectives.

Alabama
Alexander City State Junior College
Cherokee Rd.
Alexander City 35010

Chattahoochee Valley State
Community College
119 Broad St.
Phoenix City 36967

George Corley Wallace State
Community College
P.O. Drawer 1049
Selma 36701

Gadsden State Junior College
George Wallace Dr.
Gadsden 35903

Jefferson State Junior College
2601 Carson Rd.
Birmingham 35215

Alaska
Anchorage Community College
2533 Providence Ave.
Anchorage 99504

Juneau-Douglas Community College
Box 1447
Juneau 99802

Kenia Community College
Box 848
Soldothna 99669

Ketchikan Community College
7th and Madison St.
Ketchikan 99901

Tanana Valley Community College
University of Alaska
Fairbanks 99701

Arizona
Arizona College of Technology
Route 97
Winkelman 85292

Arizona Western College
P.O. Box 929
Yuma 85364

Cochise College
Douglas 85607

Eastern Arizona College
616 Church St.
Thatcher 85552

Glendale Community College
6000 West Olive Ave.
Glendale 85302

Mesa Community College
1833 West Southern Ave.
Mesa 85202

Mohave Community College
1971 Jagerson Ave.
Kingman 86401

Northland Pioneer College
203 W. Hopi Dr.
Holbrook 86025

Phoenix College
1202 West Thomas Rd.
Phoenix 85013

Pima County Community College
2202 West Anklam Rd.
Tucson 85706

Pinal County Community College District
Woodruff at Overfield Rd.
Coolidge 85226

Scottsdale Community College
9000 E. Chaparral
Scottsdale 85251

Sierra Vista Campus
Sierra Vista 85655

Yavapai College
1100 East Sheldon St.
Prescott 86301

Arkansas
State Fire Training Programs
Southwest Technical Institute
P.O. Box 45
East Camden 71701

California
Allan Hancock College
800 S. College Dr.
Santa Maria 93454

American River College
4700 College Oak Dr.
Sacramento 95841

American River College
Placerville Campus
106 Placerville Dr.
Placerville 95667

Antelope Valley College
3041 W. Ave. K
Lancaster 93534

Bakersfield College
2101 "K" St. Mall
Bakersfield 93305

Barstow Community College
2700 Barstow Rd.
Barstow 92311

Butte College
P.O. Box 183A
Oroville 95965

Cabrillo College
6500 Soquel Dr.
Aptos 95003

Cerro Coso Community College
College Heights Blvd.
Ridgecrest 93555

Chabot College
25555 Hesperian Blvd.
Hayward 94545

Chaffey College
5885 Haven Ave.
Alta Loma 91701

City College of San Francisco
50 Phelan Ave.
San Francisco 94112

Cogswell College
600 Stockton St.
San Francisco 94108

College of the Canyons
25000 W. Valencia Blvd.
Valencia 91355

College of the Desert
43500 Monterey Ave.
Palm Desert 92260

College of the Desert
High Desert Campus
6785 Sage Ave.
Twenty-Nine Palms 92277

College of the Redwoods
Redwood Center
Eureka 95501

College of San Mateo
1700 West Hillsdale Blvd.
San Mateo 94402

College of the Sequoias
915 Mooney Blvd.
Visalia 93277

College of the Siskiyous
800 College Ave.
Weed 96094

Columbia Junior College
P.O. Box 1849
Columbia 95310

Community College
Chancellor's Office
1238 "S" St.
Sacramento 95814

Cosumnes River College
8401 Center Parkway
Sacramento 95823

Crafton Hills College
11711 Sand Canyon Rd.
Yucalpa 92399

Cuesta College
P.O. Box J
San Luis Obispo 93406

East Los Angeles College
1301 Brooklyn Ave.
Monterey Park 91754

El Camino College
16007 Crenshaw Blvd.
Via Torrance 90506

Feather River College
P.O. Box 1110
Quincy 95971

Fresno City College
1101 East University Ave.
Fresno 93704

Glendale College
1500 North Verdugo Rd.
Glendale 91208

Grossmont College
8800 Grossmont College Dr.
El Cajon 92020

Hartnell College
156 Homestead Ave.
Salinas 93901

Imperial Valley College
P. O. Box 158
Imperial 92251

Indian Valley College
1800 Ignacio Blvd.
Novato 94947

Kings River College
995 N. Reed Ave.
Reedly 93654

Lake Tahoe Community College
P.O. Box 14445
South Lake Tahoe 95702

Lassen College
P.O. Box 3000
Susanville 96130

Long Beach City College
4901 East Carson St.
Long Beach 90808

Los Angeles Harbor College
111 Figueroa Place
Wilmington 90744

Los Angeles Valley College
5300 Fulton Ave.
Van Nuys 91401

Los Medanos College
2700 East Leland Rd.
Pittsburgh 94565

Merced College
3600 M St.
Merced 95340

Merritt College
12500 Campus Dr.
Oakland 94619

Mission College
3000 Mission College Blvd.
Santa Clara 95054

Modesto Junior College
2201 Blue Gum Ave.
Modesto 95352

Monterey Peninsula College
980 Fremont St.
Monterey 93940

Mount San Antonio College
1100 North Grand Ave.
Walnut 91789

Mount San Jacinto College
21400 Highway 79
San Jacinto 92383

Napa College
2277 Napa Vallejo Highway
Napa 94558

Oxnard College
4000 South Rose Ave.
Oxnard 93003

Palomar College
1140 W. Mission Rd.
San Marcos 92069

Palo Verde College
811 W. Chanslarway
Blythe 92225

Pasadena City College
1570 East Colorado Blvd.
Pasadena 91106

Porterville College
900 S. Main St.
Porterville 93257

Rio Hondo College
3600 Workman Mill Rd.
Whittier 90603

Riverside City College
4300 Magnolia Ave.
Riverside 92506

San Bernadino Valley College
701 S. Mount Vernon Ave.
San Bernadino 92403

San Diego Miramar College
10440 Black Mtn. Rd.
San Diego 92126

San Joaquin Delta College
5151 Pacific Ave.
Stockton 95207

Santa Ana College
17th and Bristol St.
Santa Ana 92706

Santa Barbara City College
721 Cliff Dr.
Santa Barbara 93109

Santa Monica College
1900 Pico Blvd.
Santa Monica 90405

Santa Rosa Junior College
1501 Mendocino Ave.
Santa Rosa 95401

Shasta College
1065 N. Old Oregon Trail
Redding 96001

Sierra College
5000 Rocklin Rd.
Rocklin 95677

Solano Community College
P.O. Box 246
Suisun City 94585

Victor Valley College
18422 Bear Valley Rd.
P.O. Drawer 00
Victorville 92392

Yuba College
2088 North Beale Rd.
Marysville 95901

Colorado

Aims Community College
P.O. Box 69
Greeley 80631

Community College of Denver
Red Rocks Campus
12600 W. 6th Ave.
Golden 80401

El Paso Community College
2200 Bott St.
Colorado Springs 80904

Pikes Peak Community College
5657 S. Academy Blvd.
Colorado Springs 80906

Trinidad State Junior College
Trinidad 81082

Connecticut

Hartford State Technical College
401 Flatbush Ave.
Hartford 06106

Greater New Haven State Technical College
71 Jones Rd.
Hamden 06514

Norwalk State Technical College
121 Richards Ave.
Norwalk 06854

Thames Valley State Technical College
547 New London Turnpike
Norwich 06360

Waterbury State Technical College
1460 West Main St.
Waterbury 06708
Larry Ford, Field Programs Coordinator

Delaware

Delaware Technical & Community College
Kent Campus
1679 South State St. Ext.
Dover 19901

Delaware Technical & Community College
Stanton Campus
P.O. Box 1260
Newark 19711

Washington, DC

University of District of Columbia
4200 Connecticut Ave., NW
20008

Southeastern University
501 I St., NW
20024

Florida

Brevard Community College
Clear Lake Rd.
Cocoa 32922

Broward Community College
3501 SW Davie Rd.
Fort Lauderdale 33314

Central Florida Community College
P.O. Box 1388
Ocala 32670

Edison Community College
College Parkway
Fort Meyers 33901

Florida Atlantic University
Administration 384
500 NW 20th St.
Boca Raton 33432

Florida Junior College at Jacksonville
21 West Church St.
Jacksonville 32216

Florida State Fire College
1501 SW Broadway
Ocala 32675

Gulf Coast Community College
5230 West Highway 98
Panama City 32401

Hillsborough Community College
P.O. Box 22127
Tampa 33622

Indian River Community College
3209 Virginia Ave.
Fort Pierce 33450

Miami Dade Community College
11380 NW 27th Ave.
Miami 33167

Okallosa-Walton Junior College
College Blvd.
Niceville 32578

Palm Beach Junior College
4200 Congress Ave.
Lake Worth 33461

Polk Community College
999 Ave. H. NE
Winter Haven 33880

St. Petersburg Junior College
P.O. Box 13489
St. Petersburg 33733

Santa Fe Community College
P.O. Box 1530
Gainesville 32601

Seminole Community College
Highway 17-29
Stanford 32771

University of South Florida
4202 Fowler Ave.
Tampa 33620

Valencia Community College
P.O. Box 3028
Orlando 32802

Georgia

Albany Junior College
Gillionville Rd.
Albany 31707

Clayton Junior College
P.O. Box 235
5900 Lee St.
Morrow 30260

Dekalb Community College
955 North Indian Creek Rd.
Clarkston 30021

Gainesville Junior College
Gainesville 30501

Hawaii

Hawaii Community College
1400 Kapiolani St.
Hilo 96720

Honolulu Community College
874 Dillingham Blvd.
Honolulu 96817

Kauai Community College
3-1901 Kaumalii Highway
Lihue Kauai 96766

Idaho

Idaho State Trade and Technical School
Box 173
Idaho State University
Pocatello 83209

Illinois

Black Hawk College
3010 4th Ave.
Moline 61244

Carl Sandburg College
2232 South Lake Storey Rd.
Box 1407
Galesburg 61401

College of DuPage
Lambert Rd. and 22nd St.
Glen Ellyn 60137

College of Lake County
19351 W. Washington St.
Grayslake 60030

Elgin Community College
1700 Spartan Dr.
Elgin 60120

Illinois Central College
Box 2400
East Peoria 61635

Joliet Junior College
1216 Houbolt Ave.
Joliet 60436

Kankakee Community College
P.O. Box 888
Kankakee 60901

Lakeland College
Mattoun 61938

Lewis and Clark Community College
Godfrey 62035

John A. Logan College
Carterville 62918

Moraine Valley Community College
10900 S. 88th Ave.
Palos Hills 60465

Oakton Community College
1600 East Gulf
Des Plaines 60016

Parkland College
2400 W. Bradley Ave.
Champaign 61820

Prairie State College
200 E. 197th St.
P.O. Box 487
Chicago Heights 60411

Rock Valley College
3301 N. Mulford Rd.
Rockford 61101

Shawnee College
Shawnee College Rd.
Ullin 62992

State Community College
417 Missouri Ave.
East St. Louis 62201

Thornton Community College
15800 S. State St.
South Holland 60473

Triton College
2000 Fifth Ave.
River Grove 60171

Waubonsee College
Rt. 47 at Harter Rd.
Sugar Grove 60554

Western Illinois University
Adams St.
Macomb 61455

William Rainey Harper College
Algonquin and Roselle Rds.
Palatin 60067

Indiana

Indiana Vocational Technical College
Northwest Region
1440 East 35th Ave.
Gary 46409

Indiana Vocational Technical College
South Bend
1534 W. Sample St.
South Bend 46619

Iowa

Des Moines Area Community College
20006 Ankeny Blvd.
Ankeny 50021

Kirkwood Community College
6301 Kirkwood Blvd., SW
P.O. Box 2068
Cedar Rapids 52406

Southeastern Community College
Drawer F, Highway 406
West Burlington 52655

Kansas

Butler County Community Junior College
Box 888
El Dorado 67042

Dodge City Community Junior College
U.S. 50 By-Pass and 14th Ave.
Dodge City 67801

Hutchinson Community Junior College
1300 North Plum
Hutchinson 67501

Johnson County Community Junior College
12345 College Blvd. at Quivira
Overland Park 66210

Kansas City Kansas Community Junior College
7250 State Ave.
Kansas City 66112

Kentucky
Eastern Kentucky University
College of Law Enforcement
Richmond 40475

Jefferson County Community College
P.O. Box 1036
Louisville 40201

Lexington Technical Institute
313 Breckinridge Hall
Lexington 40506

Northern Kentucky University
University Dr.
Highland Heights 41076

Western Kentucky University
Bowling Green 42101

Louisiana
Delgado College
615 City Park Ave.
New Orleans 70119

Louisiana State University at Eunice
P.O. Box 1129
Eunice 70535

Maine
Southern Maine Vocational and Technical Institute
Stephen Husson, State Coordinator
Fire Science Program
2 Fort Rd.
South Portland 04106
(207) 799-7303, Ext. 295

Maryland
Catonsville Community College
800 South Rolling Rd.
Catonsville 21228

Charles County Community College
P.O. Box 910
LaPlata 20646

Community College of Baltimore
Harbor Campus
2901 Liberty Heights Ave.
Baltimore 21215

Hagerstown Junior College
751 Robinwood Dr.
Hagerstown 21740

Montgomery College
51 Manakee St.
Rockville 20850

Massachusetts
Berkshire Community College
West Street
Pittsfield 01201

Bristol Community College
777 Elsbree St.
Fall River 02720

Bunker Hill Community College
Charlestown 02129

Cape Cod Community College
Rt. 132
West Barnstable 02668

Greenfield Community College
Greenfield 01301

Mass. Bay Community College
57 Stanley Ave.
Watertown 02172

Massasoit Community College
290 Thatcher St.
Brockton 02402

Middlesex Community College
21 Springs Rd.
Bedford 01730

Mount Wachusett Community College
444 Green St.
Gardner 01440

Northeastern University
360 Huntington Ave.
Boston 02115

North Shore Community College
3 Essex St.
Beverly 01915

Quinsigamond Community College
670 West Boylston St.
Worcester 01606

Springfield Technical Community College
1 Armory Square
Springfield 01105

Michigan
Alpena Community College
666 Johnson St.
Alpena 49707

Jackson Community College
2111 Emmons Rd.
Jackson 49201

Kellogg Community College
450 North Ave.
Battlecreek 49016

Lake Michigan College
2755 E. Napier Ave.
Benton Harbor 49022

Lansing Community College
419 N. Capital Ave.
Lansing 48901

Macomb Community College
Box 309
Warren 48093

Madonna College
36600 School Craft Rd.
Livonia 48150

Mid-Michigan Community College
1375 S. Clare Ave.
Harrison 48625

Mississippi
Hinds Junior College
Raymond 39154

Minnesota
Metropolitan Community College
1419 Harmon Place
Minneapolis 55403

Missouri
East Center Missouri Junior College
P.O. Box 529
Union 63084

Jefferson College
Hillsboro 63050

Penn Valley Community College
3201 Southwest Trafficway
Kansas City 64111

St. Louis Community College at Forest Park
5600 Oakland Ave.
St. Louis 63110

St. Louis Community College at Florissant Valley
3400 Pershall Rd.
St. Louis 63135

Montana
College of Great Falls
1301 20th St. S.
Great Falls 59405

Eastern Montana College
1500 North 27th St.
Billings 59101

Nebraska
Mid-Plains Technical Community College
Interstate 20 and Highway 83
North Platte 69101

Southeast Community College
Lincoln Campus
8800 "O" St.
Lincoln 68520

University of Nebraska at Omaha
College of Engineering
P.O. Box 688
Omaha 68101

Western Nebraska Technical College
Sidney 69162

Nevada
Clark County Community College
3200 E. Cheyenne Ave.
Las Vegas 89030

Northern Nevada Community College
901 Elm Street
Elko 89801

Truckee Meadows Community College
7000 El Rancho Dr.
Sparks 89431

Western Nevada Community College
2201 West Nye Lane
Carson City 89701

New Hampshire
New Hampshire Vocational Technical College
Prescott Hill
Laconia 03246

New Jersey
Atlantic Community College
Black Horse Pike
Mays Landing 08330

Bergen Community College
400 Paramus Rd.
Paramus 07652

Camden County College
P.O. Box 200
Blackwood 08012

Essex County College
303 University Ave.
Newark 07102

Mercer County Community College
1200 Old Trenton Rd.
Trenton 08690

Middlesex County College
Edison 08818

Ocean County College
College Dr.
Toms River 08753

Passaic County Community College
Memorial Dr.
Paterson 07505

Somerset County College
P.O. Box 3300
Somerville 08876

Union College
1033 Springfield Ave.
Cranford 07016

Union County Technical Institute
1776 Raritan Rd.
Scotch Plains 07076

New Mexico
University of Albuquerque
St. Joseph Place NW
Albuquerque 87120

New York
Broome Community College
Upper Front St.
Binghamton 13902

Clinton Community College Point
Bluff Point
Plattsburgh 12901

Erie Community College
Main Street and Youngs Rd.
Amherst 14221

Jamestown Community College
525 Falconer St.
Jamestown 14701

Mercy College
555 Broadway
Dobbs Ferry 10522

Monroe Community College
1000 East Henrietta Rd.
P.O. Box 9720
Rochester 14623

Mohawk Valley Community College
1101 Sherman Dr.
Utica 13501

New York City Community College
City University of New York
300 Jay St.
Brooklyn 11201

Onondaga Community College
Onondaga Hill Rd.
Syracuse 13215

Orange County Community College
115 South St.
Middletown 10940

Rockland Community College
145 College Rd.
Suffern 10901

Schenectady County Community College
Washington Ave.
Schenectady 12305

Suffolk County Community College
533 College Rd.
Selden 11784

Tompkins Cortland Community College
170 North St.
Dryden 13053

Ulster County Community College
Stone Ridge 12484

Westchester Community College
75 Grasslands Rd.
Valhalla 10595

North Carolina
Central Piedmont Community College
P.O. Box 4009
Charlotte 28204

Durham Technical Institute
1637 Lawson St.
P.O. Drawer 11307
Durham 27703

Gaston College
New Dallas Highway
Dallas 28034

Guilford Technical Institute
P.O. Box 309
Jamestown 27282

Forsyth Technical Institute
2100 Silas Creek Parkway
Winston-Salem 27103

James Sprunt Technical Institute
P.O. Box 398
Kenansville 28349

Randolph Technical Institute
Drawer 1009
Asheboro 27203

Richmond Technical Institute
P.O. Box 1189
Hamlet 28345

Western Piedmont Community College
1001 Burkemont Ave.
Morganton 28655

Wilson County Technical Institute
902 Herring Ave.
Wilson 27893

Ohio

Columbus Technical Institute
Box 1609
550 Spring St.
Columbus 43215

Cuyahoga Community College
2900 Community College Ave.
Cleveland 44115

Hocking Technical College
Route 1
Nelsonville 45764

Lakeland Community College
Mentor 44066

Lorain County Community College
1005 N. Abbe Rd.
Elyria 44035

Michael Owens Technical College
30335 Oregon Rd.
Toledo 43699

Sinclair Community College
444 W. 3rd St.
Dayton 45402

Stark Technical College
6200 Frank Ave., NW
Canton 44720

University of Akron
302 E. Bukchtel Ave.
Akron 44325

University of Cincinnati
College of Applied Science
100 E. Central Park
Cincinnati 45210

Oklahoma

Oklahoma State University
301 Campus Fire Station
Stillwater 74074

Oklahoma State University Technical Institute
900 N. Portland St.
Oklahoma City 73107

Tulsa Junior College
10th and Boston Sts.
Tulsa 74119

Oregon

Chemeketa Community College
4000 Lancaster Dr. NE
Salem 97303

Clackamas Community College
19600 Molalla Ave.
Oregon City 97045

Linn-Benton Community College
6500 SW Pacific Blvd.
Albany 97321

Mt. Hood Community College
26000 SE Stark
Gresham 97030

Portland Community College
12000 SW 49th Ave.
Portland 97219

Rogue Community College
3345 Redwood Highway
Grants Pass 97526

Southwestern Oregon Community College
Coos Bay 97420

Umpqua Community College
P.O. Box 967
Roseburg 97470

Pennsylvania

Community College of Allegheny College
Boyce Campus
595 Beatty Rd.
Monroeville 15146

Community College of Philadelphia
34 S. 11th St.
Philadelphia 19107

Delaware Community College
Media 19063

Harrisburg Area Community College
3300 N. Cameron St. Rd.
Harrisburg 17110

Lackawanna Junior College
635 Linden St.
Scranton 18503

Luzerne County Community College
Prospect St. and College Middle Rd.
Nanticoke 18634

Montgomery County Community College
340 Dekalb Pike
Blue Bell 19422

Northampton County Area
Community College
3835 Green Pond Rd.
Bethlehem 18017

Westmoreland County Community College
Armbrust Rd.
Youngwood 15697

Rhode Island

Providence College
School of Continuing Education
Providence 02918

Rhode Island Junior College
400 East Ave.
Warwick 02886

South Carolina

Midlands Technical College
Airport Campus
West Columbia 29205

Tennessee

Chattanooga State Technical Community
College
4501 Amnicola Highway
Chattanooga 37406

Shelby State Community College
P.O. Box 4563
Memphis 38104

Roane State Community College
P.O. Box 712
Harriman 37748

Texas

Amarillo College
P.O. Box 447
Amarillo 79178

Austin Community College
P.O. Box 2285
Austin 78702

Bee County College
3800 Charco Rd.
Beeville 78120

Blinn College
Brenham 77833

Cisco Junior College
Route 3, Box 3
Cisco 76437

Del Mar College - West Campus
Baldwin at Ayres
Corpus Christi 78404

El Centro College
Main and Lamar Sts.
Dallas 75202

El Paso Community College
6601 Dyer St.
El Paso 79904

Galveston College
4015 Ave. O
Galveston 77550

Houston Community College
22 Waugh Dr.
Houston 77007

Kilgore College
1100 Broadway
Kilgore 75662

Laredo Junior College
P.O. Box 738
Laredo 78040

Midland College
3600 N. Garfield
Midland 79701

Odessa College
P.O. Box 3752
2501 Andrews Highway
Odessa 79760

San Antonio College
1300 San Pedro Ave.
San Antonio 78284

San Jacinto College
8060 Spencer Highway
Pasadena 77505

South Plains College
Levelland 79336

Southern Methodist University
Institute of Management
P.O. Box 319
Dallas 75275

Tarrant County Junior College
Electric Service Building
Fort Worth 76102

Temple Junior College
2600 S. First St.
Temple 76501

Texas Southmost College
83 Fort Brown St.
Brownsville 78520

Texas State Technical Institute
James Connally Campus
Waco 76705

Texarkana Community College
2500 N. Robison Rd.
Texarkana 75501

Tyler Junior College
Henderson Highway
Tyler 75701

Victoria College
2200 E. Red River
Victoria 77901

Utah
Utah Technical College
1395 North 150 E
Provo 84601

Vermont
Champlain College
232 S. Willard St.
Burlington 05401

Virginia
Blue Ridge Community College
P.O. Box 80
Weyers Cave 24486

Central Virginia Community College
P.O. Box 4098, Fort Hill Station
Lynchburg 24502

Northern Virginia Community College
8333 Little River Turnpike
Annandale 22003

J. Sargeant Reynolds Community College
108 E. Grace St.
P.O. Box 12084
Richmond 23241

Thomas Nelson Community College
P.O. Box 9407
Hampton 23670

Tidewater Community College
Virginia Beach Campus
1700 College Crescent
Virginia Beach 23456

Washington
Bates Vocational Technical Institute
1101 S. Yahima Ave.
Tacoma 98405

Clark College
1800 E. McLoughlin Blvd.
Vancouver 98663

Columbia Basin Community College
2600 N. 20th Ave.
Pasco 99301

Edmonds Community College
20000 68th Ave. W
Lynnwood 98036

Everett Community College
801 Wetmore
Everett 98201

Gray's Harbor College
Aberdeen 98520

North Seattle Community College
9600 College Way N
Seattle 98103

Fort Steilacoom Community College
9401 Farwest Dr. SW
Tacoma 99498

Spokane Community College
E 3403 Mission Ave.
Spokane 99202

Wenatchee Valley College
1300 Fifth St.
Wenatchee 98801

Yakima Valley Community College
South 16th Ave. at Nob Hill Blvd.
Yakima 98907

West Virginia
Fairmont State College
Locust Ave.
Fairmont 26554

Marshall University
Huntington 25701

Parkersburg Community College
Route 5, Box 167-A
Parkersburg 26101

Sheperd College
Sheperdstown 25443

West Virginia Northern Community College
College Square
Wheeling 26003

West Virginia State College
Institute 25112

Wisconsin
Blackhawk Technical Institute
2228 Center Ave.
Janesville 53545

Fox Valley Technical Institute
1825 North Bluemound Dr.
P.O. Box 888
Appleton 54911

Gateway Technical Institute
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Racine 53403

Madison Area Technical College
211 North Carroll St.
Madison 53703

Milwaukee Area Technical College
1015 N. 6th St.
Milwaukee 53203

Northeast Wisconsin Institute
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Green Bay 53403

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STATE FIRE SERVICE TRAINING FACILITIES

State	Facility Name/Address	Residential	Food Service	No. of Classrooms	Capacity of Largest Classroom or Auditorium	Total Capacity of School	Fixed Training Aids On Site
Alabama	Alabama State Fire College 2015 McFarland Blvd., Tuscaloosa	no	no	6	200	325	Tower, structural burn building, smoke building, flammable liquids tank, sprinkler laboratory, flammable gas props, fire extinguisher training facility, flammable liquids pit, inclined trough to provide a running flammable liquid fire.
Alaska	Anchorage Regional Fire Training Center 1140 Airport Heights Rd. Anchorage 99504	yes	no	5	40	180–200	Tower, structural burn building, smoke building, sprinkler laboratory, vehicles, fire extinguishers training facility.
	Juneau Regional Fire Training Center Sherwood Lane Juneau 99801	no	no	0			Tower, structural burn building, smoke building, flammable liquids tank, sprinkler laboratory, flammable gas props, fire extinguisher training facility, marine fire fighting capability (including damage control and shipboard rescue).
	Fairbanks Regional Fire Training Center Lathrop Ave. Fairbanks 99701 Under Construction	no	no	1	40	40	Tower, structural burn building, smoke building, sprinkler laboratory, vehicles, fire extinguisher training facility.
Arizona	No state-owned fire training facilities						

Arkansas	Arkansas Fire Academy P.O. Box 3048 East Camden 71701	yes	yes	3	100	300	Tower, structural burn building, smoke building, flammable liquids tank, flammable gas props, vehicles, fire extinguisher training facility, rescue facilities.
California	No state-owned fire training facilities						
Colorado	No state-owned fire training facilities						
Connecticut	No state-owned fire training facilities	(State subsidizes six regional fire training schools.)					
Delaware	Delaware State Fire School R.D. #2, Box 166 Dover 19901	no	yes	5	250	650	Tower, structural burn building, smoke building, flammable liquids tank, flammable gas props. fire extinguisher training facility, forcible entry building, flammable liquids pit, flammable liquids props.
Florida	Florida State Fire College 1501 SW Broadway Ocala 32675	no	no	3	125	250	Tower, structural burn building, smoke building, flammable liquids tank, sprinkler laboratory, flammable gas props, vehicles, fire extinguisher training facility, drafting pit.
Georgia	Georgia Fire Academy Marietta	no	no	2	60	80	Tower, structural burn building, smoke building, sprinkler laboratory.
Hawaii	A training facility for the County of Hawaii is now in the planning stage. It will be shared by the Honolulu Fire Departments and the Federal Fire Departments.						

State	Facility Name/Address	Residential	Food Service	No. of Classrooms	Capacity of Largest Classroom or Auditorium	Total Capacity of School	Fixed Training Aids On Site
Idaho	No state-owned fire training facilities						
Illinois	Illinois Fire Service Institute Training Grounds Urbana/Champaign	no	no	1	75	75	Tower, structural burn building, smoke building, flammable liquids tank, flammable gas props, vehicles, fire extinguisher training facility.
Indiana	No state-owned fire training facilities						
Iowa	Fire Service Extension Building Iowa State University Ames	no	no	8	250	350	Flammable liquids tank, flammable gas props, fire extinguisher training facility, high voltage.
	Iowa State Center Coliseum and Continuing Education Building	yes	yes	31	14,000+	25,000+	
Kansas	No state-owned fire training facilities						
Kentucky	No state-owned fire training facilities						
Louisiana	Louisiana State University	no	no	4	300	420	Tower, structural burn building, smoke building, flammable liquids tank, sprinkler laboratory, flammable gas props, aircraft mockup, vehicles, fire extinguisher training facility.
Maine	No state-owned fire training facilities						

Maryland	Maryland Fire and Rescue Institute University of Maryland College Park 20472						
Massachusetts	Massachusetts Fire Fighting Academy Basic Training Facility Stow	no	no	2	100	135	Tower, smoke building, flammable liquids tank and props, sprinkler laboratory, vehicles, fire extinguisher training facility.
	C.D. Training Academy Topsfield	yes	yes	4	40	150	Tower, structural burn building, flammable liquids tank, flammable gas props, vehicles, fire extinguisher training facility, heavy rescue.
	Barnstable Training Facility Hyannis	no	no	2	150	200	Tower, structural burn building, smoke building, flammable liquids tank, sprinkler laboratory, vehicles, fire extinguisher training facility.
	Massachusetts Fire Fighting Academy Headquarters Sudbury	no	no	6	150	300	None.
	Massachusetts Fire Fighting Academy Hopkinton	no	no	1	30	30	Flammable gas props.
Michigan	University of Michigan Ann Arbor	yes	yes	3	30	90	Tower, structural burn building, smoke building, flammable liquids tank, fire extinguisher training facility.
Minnesota	No state-owned fire training facilities.						

State	Facility Name/Address	Residential	Food Service	No. of Classrooms	Capacity of Largest Classroom or Auditorium	Total Capacity of School	Fixed Training Aids On Site
Mississippi	Mississippi Fire Academy Rankin County	no	no	8	200	715	Tower, structural burn building, smoke building, flammable liquids tank, sprinkler laboratory, flammable gas props, vehicles, fire extinguisher training facility, control tower.
Missouri	No state-owned fire training facilities						
Montana	No state-owned fire training facilities						
Nebraska	Nebraska Fire Service Lincoln	no	no	1	35	35	Vehicles.
Nevada	No state-owned fire training facilities						
New Hampshire	No state-owned fire training facilities						
New Jersey	No state-owned fire training facilities						
New Mexico	No state-owned fire training facilities						
New York	The Senator Frederick L. Warder Academy of Fire Science Montour Falls	yes	yes	12	300	450–500	Structural burn building, flammable liquids tank, sprinkler laboratory, vehicles, fire extinguisher training facility. To be constructed: smoke building and flammable gas props.

North Carolina	Department of Community Colleges operates or assists in the operation of 30 regional training facilities, all of which are owned by some combination of county, city, or state.	no	yes	Not on Site	100–350		Tower, structural burn building, smoke building, flammable liquids tank, sprinkler laboratory, flammable gas props, aircraft mockup, vehicles, fire extinguisher training facility.
	Department of Insurance No state-owned fire training facilities						
North Dakota	No state-owned fire training facilities						
Ohio	Ohio Fire Academy Reynoldsburg	yes	yes	9	200	350	Tower, smoke building, flammable liquids tank, sprinkler laboratory, flammable gas props, aircraft mockup, vehicles, fire extinguisher training facility, SCBA situation maze. High intensity burn building.
Oklahoma	Fire Service Training Oklahoma State University Stillwater 74074	no	no	Under Construction			Tower, flammable liquids tank, sprinkler laboratory, fire extinguisher training facility. Interior fire attack facility.
Oregon	No state-owned fire training facilities						
Pennsylvania	Pennsylvania State Fire Academy Lewistown	no	no	6	275	320	Tower, structural burn building, smoke building, flammable liquids tank, sprinkler laboratory, flammable gas props, vehicles, fire extinguisher training facility, pump laboratories.

State	Facility Name/Address	Residential	Food Service	No. of Classrooms	Capacity of Largest Classroom or Auditorium	Total Capacity of School	Fixed Training Aids On Site
Rhode Island	Community College of Rhode Island, Knight Campus 400 East Ave. Warwick	no	yes	40	1,000	2,000	Flammable gas props, vehicles, fire extinguisher training facility, ice rescue in season.
South Carolina	South Carolina Fire Academy West Columbia 29169	no	no	4	125	210	Tower, structural burn building.
South Dakota	No state-owned fire training facilities						
Tennessee	Tennessee State Fire School 1303 Old Fort Parkway Murfreesboro 37130	no	no	6	100	200	Tower, structural burn building, smoke building, sprinkler laboratory, flammable gas props, fire extinguisher training facility, smoke/rescue mask training facility.
Texas	Brayton Firemen Training Field Texas A&M University College Station	yes	yes	4	3,000	2,000	Tower, structural burn buildings, smoke building, flammable liquids tank, sprinkler laboratory, flammable gas props, aircraft mockup, vehicles, fire extinguisher training facility, pumper test pits, forcible entry training aid, pump maintenance training aid, rescue props, shipboard fire props, pipe rack fire props, progress unit fire props, chemical complex fire props, LNG fire props, fire extinguisher systems facility.

Utah	No state-owned fire training facilities						
Vermont	No state-owned fire training facilities						
Virginia	State Fire Training Center Ashland Leased by State	no	no	2	75	115	Tower, structural burn building, smoke building, flammable liquids tank, sprinkler laboratory, flammable gas props, vehicles, drafting pond.
Washington	Washington State Fire Training Center I-90 East of North Bend To be completed 1983	no	no	2	60		Tower, structural burn building, smoke building, flammable liquids tank, sprinkler laboratory, flammable gas props, aircraft mockup, vehicles, fire extinguisher training facility, shipboard.
West Virginia	West Virginia Fire Service Extension Morgantown	yes	yes	3			Tower, structural burn building, vehicles.
	Tri-State Fire School Huntington	no	no	5–7	150	350	Tower, smoke building, flammable liquids tank.
Wisconsin	Milwaukee Fire Academy 6680 N. Teutonia Ave. Milwaukee	Under Construction	no	8	400	650	Tower, structural burn building, smoke building, flammable liquids tank, sprinkler laboratory, flammable gas props, vehicles, fire extinguisher training facility, fire boats.
Wyoming	No state-owned fire training facilities						

Fire Fighter Safety

Fire Fighter Deaths and Injuries

Because fire fighters work in hazardous environments, they face special health hazards that increase the risk of accidental death and injury. Fatal accidents and injuries may not be entirely preventable, but understanding how they occur is necessary so that specific corrective actions can be developed to minimize the inherent risks.

The NFPA studies fire fighter deaths and injuries to provide national statistics on their frequency, extent, and characteristics and, ultimately, to improve the safety of all fire fighters.

Fire Fighter Deaths

Total and by Nature of Injury by Year (1978-82)

The NFPA annually seeks data on all fire fighter deaths in the line of duty, and prepares a report that summarizes findings.[1,2,3,4,5]

Based upon reports verified by the NFPA for the five-year period 1978 to 1982, there was an average of 130 fire fighter deaths per year. The highest number of deaths during the period (162) occurred in 1978 and the lowest number (113) occurred in 1979. The 1978 experience was affected by increases in the number of deaths due to traumatic injuries (e.g., wound, cut, bleeding, dislocation, fracture), smoke inhalation, and heart attacks. Fluctuations in the other years of the period are also related to the reported annual experience in these three causal categories.

By nature of injury over the five-year period, heart attacks were the leading type of injury, accounting for 45.2 percent of all fire fighter fatalities. Over the 1975-1982 period, the annual proportion of fire fighter deaths from heart attacks ranged from 38.9 to 52.0 percent (see graph p. 374). The consistently high proportion of heart attack deaths points to the importance of coronary artery disease, the primary condition that precipitates heart attacks, as a major health problem among fire fighters. For example, in 1980, autopsies were available for 21 fire fighters who died from heart attacks. Nineteen were found to have severe arteriosclerosis which caused the fatal heart attacks. The extent of coronary heart disease in fire fighters has been documented by other researchers. In their 1979 Annual Death and Injury Survey of career U.S. and Canadian fire fighters, the International Association of Fire Fighters reported that 57 percent of the 77 deaths from occupational diseases were due to heart disease.[6] Based on extensive studies of Los Angeles City and New York City fire fighters, Barnard concluded that fire fighters have an abnormally high incidence of coronary heart disease, especially since they are a medically selected population with low risk factors for the disease.[7] Years of exposure to the stress encountered on the job, to carbon monoxide, and to other factors that greatly increase the heart's oxygen requirements, take a heavy toll.

The seriousness of these findings has generated widespread concern for improving the health status of fire fighters. Increasing numbers of fire departments are instituting health maintenance programs aimed at reducing the risks of developing coronary heart disease. The programs include periodic medical examinations, rigorous physical fitness activities, and educational programs on nutrition, weight control, substance abuse, and reduction of stress. These programs should continue to gain support and become established in many more fire departments throughout the country. (For some of these programs, see the report on safety programs in this section.)

Another major category of nature of fatal injury for the five-year period was traumatic injuries accounting for 22.3 percent of all fire fatalities; this type of injury is often the result of vehicle and apparatus accidents while responding to or returning from an incident, structural collapse, and falls. The exposure to fire products categories (burns and smoke inhalation, burns only, and smoke inhalation only) accounted for a considerable 18.8 percent of all fire fighter fatalities during the five-year period. The proper use of self-contained breathing apparatus (SCBA) is vital to the safety of fire fighters.[6] (See Use of Self-Contained Breathing Apparatus, later in this section.)

Type of Duty (1982)

The largest proportion of deaths, 59.0 percent, occurred during fire ground operations. The number of fire ground deaths has remained relatively constant since 1978. Deaths that occurred while responding to or returning from fire and nonfire alarms accounted for 21.4

Two fire fighters suffered heart attacks, one fatally, while extinguishing a fire in a sign company located in Pensacola, Florida. The fire occurred late one afternoon in March 1983 when an argument between the owner and an employee ended in the employee pouring flammable liquid from a 5-gallon bucket on the owner and another employee, as well as on office furniture and the floor. The disgruntled employee then lit the fire, was subsequently caught running from the scene, and was charged with one count of murder, three counts of attempted murder, and one count of first degree arson. (Pensacola News-Journal)

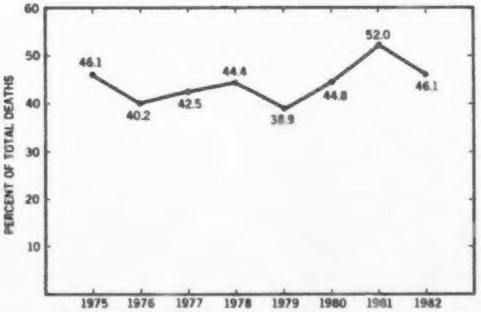
FIRE FIGHTER DEATHS IN THE LINE OF DUTY TOTAL AND BY NATURE OF FATAL INJURY BY YEAR (1978-1982)

Nature of Fatal Injury	1978	1979	1980	1981	1982
TOTAL	162	113	134	123	117
Burns and Smoke Inhalation	0	13	4	4	3
Burns Only	9	4	7	3	3
Smoke Inhalation Only	24	13	10	13	12
Traumatic*	47	24	38	27	36
Heart Attack	72	44	60	64	54
Electrocution	5	1	3	5	3
Drowning	3	0	6	3	2
Internal Injury Not Classified	1	13	5	2	3
Other	1	1	1	2	1

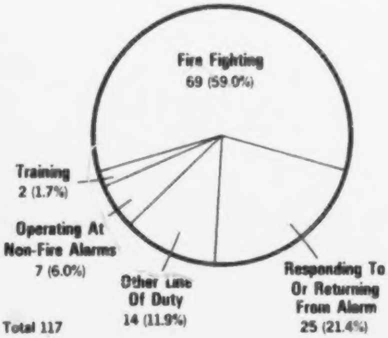
These figures are based on the annual NFPA fire fatality study (1978-1982).

*Includes cases where the fatal injury was of a traumatic nature, e.g., wound, cut, bleeding, dislocation, fracture.

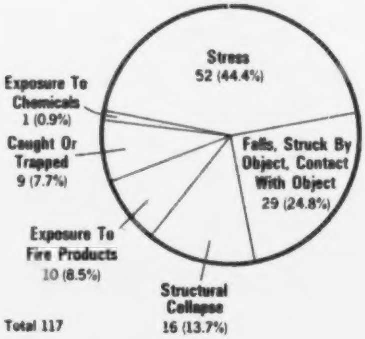
Proportion of Deaths From Heart Attack, 1975-1982



Fire Fighter Deaths By Type Of Duty, 1982



Causes Of Fatal Injuries To Fire Fighters, 1982



percent. Seven deaths (6.0 percent) took place during operations at nonfire incidents, which include auto accidents and water rescues. Training accounted for 1.7 percent of the deaths. Seven deaths (6.0 percent) occurred during all other nonfire on-duty activities, e.g., working at the station, maintenance of equipment, and inspections.

Cause of Fatal Injury or Illness (1982)

As in the previous four years, the primary cause of death was stress[9] (44.4 percent). Falls, struck by object, and contact with object resulted in the second largest proportion of deaths (24.8 percent). These 29 deaths included 18 in motor vehicle collisions, including one aircraft crash; 3 electrocutions; 3 falls from emergency apparatus; 2 struck by fire department equipment (breathing apparatus); 1 struck by a door that blew off during a shipboard explosion; 1 murdered in a fire station; and 1 fatally struck while attempting to rescue someone from an ax wielder.

Sixteen deaths (13.7 percent) resulted from structural collapse (i.e., a major, integral part of the structure failed as a result of fire). This is double the number for 1981, but compares with the experience for 1980 and 1979. Of these 16 deaths, 4 were caused by roof collapse, 5 by wall collapse, 2 by a ceiling collapse, 2 by a floor collapse, and 1 each by a chimney, a steeple, and a canopy collapse.

Exposure to fire products was the cause in 10 deaths in 1982. Eight were attributed to exposure to smoke and 2 to fire. The 1 death resulting from exposure to chemicals involved a fire fighter who died of carbon monoxide poisoning while repairing a fire truck.

Nine deaths (7.7 percent) occurred when fire fighters were caught or trapped. These included 2 drownings, 3 caught by flashover, 1 by a backdraft, 1 by a brush fire, and 2 lost inside buildings.

Use of Self-Contained Breathing Apparatus (1982)

In the 1982 fire fighter fatality study, the use of self-contained breathing apparatus (SCBA) was examined in deaths associated with exposure to fire products, structural collapse, and caught or trapped by flashover or backdraft. In the 10 deaths caused by exposure to fire products, none of the fire fighters was equipped with SCBA. The two exposed to flame died of burns. Five of the 8 exposed to smoke died of smoke inhalation; the other 3 died of heart attacks.

In other incidents, where the cause of fatal injury was structural collapse or caught or trapped by flashover or backdraft, another 11 fire fighters died of smoke inhalation and burns. Of these, one was not using SCBA. This fire fighter, who was with the Wisconsin Department of Natural Resources, was using a tractor to plow a fire break at a brush fire and was overrun by the fire.

The circumstances surrounding the deaths of the 10 fire fighters who were using SCBA were examined. In two incidents, 3 fire fighters were trapped by flashover. In one of these incidents, 2 fire fighters died of smoke inhalation and burns during a training exercise. In the other incident, a fire fighter ran out of air after becoming trapped; he died of smoke inhalation. In four incidents of structural collapse, individual fire fighters were trapped in debris and died of smoke inhalation. Two fire fighters became disoriented in buildings and died of smoke inhalation. Finally, a backdraft explosion engulfed a fire fighter in flames, and he died of burns.

Ages of Fire Fighter Fatalities (1982)

Fire fighters who died in the line of duty in 1982 ranged in age from 16 to 70 years, with a mean age of 42.7 years.

In the past four years it was noted that the distribution of deaths by age produced two peak age groups associated with the largest number of deaths. The first peak occurred usually between ages 26 and 30 and the second peak occurred among older fire fighters.

This pattern did not emerge in 1982, as shown on the graph below. The lowest number of deaths occurred among fire fighters 20 years and under (7 deaths). The number of deaths climbed to a peak at 31 through 35 years (15 deaths), and stayed at 12 or more deaths in each interval, except for a drop at 36 through 40 years (9 deaths). This is the age interval that had the highest number of deaths in 1981.

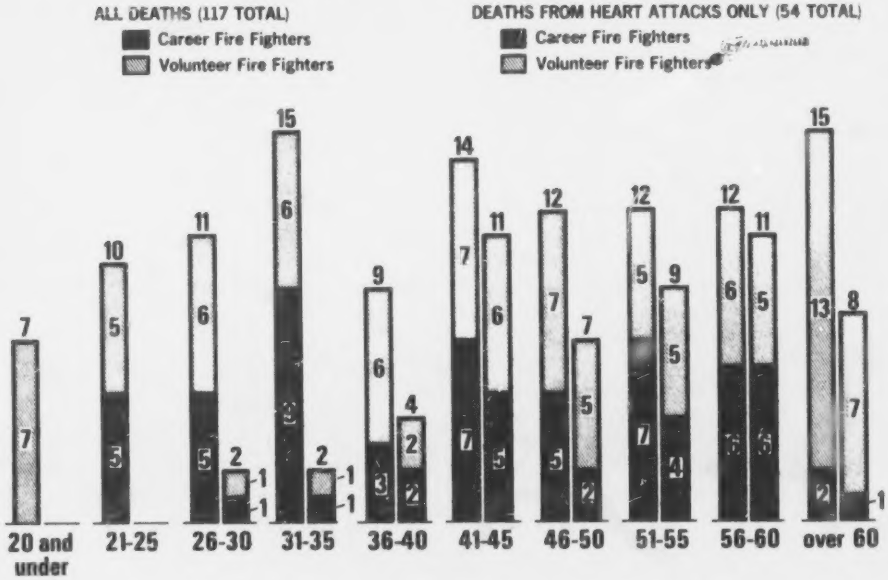
There are between 5 and 7 volunteer fire fighter deaths in every age interval (6 deaths at 61 through 65 years, and 7 at 66 through 70 years). In past years, the distribution of volunteer fire fighter deaths by age has followed a pattern similar to that for all deaths.

Although it is still true that younger fire fighters more often died of traumatic injuries — such as fractures, wounds, electrocution and drowning — and older fire fighters more often died of heart attacks, the differences were not as pronounced as in 1981. Fire fighters 45 and under accounted for 77.8 percent of the deaths caused by burns and/or smoke inhalation, compared to 95 percent in 1981. Heart attacks remained the primary cause of death in fire fighters over age 45, accounting for 68.6 percent of the deaths in 1982 compared to 80 percent in 1981, but 40 percent of the fire fighters over age 60 died of traumatic injuries.

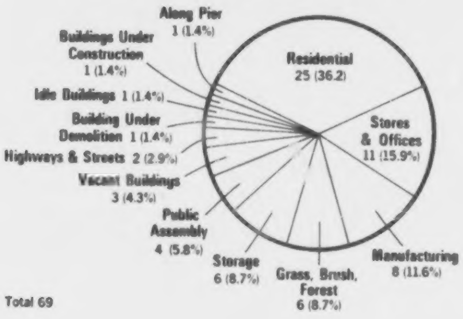
The graph also shows the age distribution for heart attacks. As in past years, the proportion of heart attacks among older fire fighters is very high, but, as noted previously, not as high as for 1981. The two most obvious changes from 1981 appear in the intervals 41 through 45 and over 60. For fire fighters ages 41 through 45, only 5 of the 12 deaths (41.7 percent) resulted from heart attacks in 1981, while in 1982, 11 of 14 (78.6 percent) were from heart attacks. For fire fighters over 60, 15 of the 16 deaths (93.75 percent) in 1981 resulted from heart attacks, while in 1982, only 8 of the 15 deaths (53.3 percent) were from heart attacks.

No fire fighter under age 26 died of a heart attack in 1982 but 4 of the 43 deaths of fire fighters under age 36 (9.3 percent) were due to heart attacks. This is the lowest proportion in this age group for the years 1980-82. Autopsies were available for these four fire fighters and all showed prior heart disease.

Ages of Fire Fighters Who Died in the Line of Duty, 1982



Fire Ground Deaths by Fixed Property Use, 1982



Fire Ground Deaths by Property Type (1982)

The distribution of the 69 fire ground deaths by fixed property use is shown in the figure above. The largest proportion of deaths occurred in residential properties (36.2 percent). Of these 25 deaths, 16 occurred in one- and two-family dwellings. The next largest categories were stores and offices (15.9 percent), manufacturing (11.6 percent), storage (8.7 percent) and grass, brush and forest fires (8.7 percent). Public assembly properties accounted for 5.8 percent; of these 4 deaths, 3 were in churches, 1 was in a restaurant. Vacant properties (properties without contents) were involved in 3 deaths (4.3 percent). One death each occurred in a ship docked at a pier, in an idle building (holds some or all contents of previous occupancy), in a building under construction, and in a building under demolition. Two deaths occurred on public streets—one heart attack at a vehicle fire and one when a fire fighter extinguishing burning bales of hay scattered on the road was struck by a drunk driver.

To account for the relative fire experience of different property types, the number of deaths per 100,000 fires was examined by property use. Estimates of the fire experience of each property type were obtained from the NFPA 1981 fire loss study.[10] In 1982, there were 3.4 deaths per 100,000 residential fires. The death rates in 1981 and 1980 were 4.2 and 4.3, respectively. For fires in nonresidential occupancies, there were 13.6 deaths per 100,000 fires. This is four times the residential rate. Although fewer fires occur in nonresidential occupancies, death rates in these properties are higher than in residential properties because fire fighters encounter more hazardous materials and greater fire fighting problems.

In 1982, 21 of the 69 fire ground deaths (30.4 percent) resulted from fighting incendiary and suspicious fires, 6 deaths (8.7 percent) involved search and rescue operations, and 3 deaths (4.3 percent) occurred in abandoned buildings.

Career and Volunteer Comparison (1982)

The number of career fire fighters killed in 1982 decreased by 23.4 percent (15 deaths) from 1981. The number of volunteers killed increased by 15.3 percent (9 deaths). Most of the decrease in career fire fighter deaths appears under the category "operating at the fire ground." There was no change in this category for volunteer fire fighters; however, the number of deaths while responding to or returning from alarms increased by 50 percent (7 deaths) for volunteers.

The distribution by type of duty for career and volunteer fire fighters shows that, while fire ground operations account for the highest proportion of deaths in both groups, the remaining categories contain notable differences (see table pp. 378-379). Almost 31 percent of the deaths among volunteers occurred while responding to or returning from alarms, compared to 8.2 percent for career fire fighters. All deaths at nonfire alarms involved volunteers, while both deaths at training exercises involved career fire fighters.

Comparison of line-of-duty deaths

	Career		Volunteer[a]	
	Number of deaths	Percent of deaths	Number of deaths	Percent of deaths
Type of duty				
Operating at fire ground	34	69.4	35	51.5
Responding to or returning from alarm	4	8.1	21	30.9
Operating at nonfire alarm	0	0.0	7	10.3
Training	2	4.1	0	0.0
Other line of duty	9	18.4	5	7.3
Totals	49	100.0	68	100.0
Cause of fatal injury				
Exposure to chemicals	0	0.0	1	1.5
Caught/trapped	6	12.3	3	4.4
Exposure to fire products	3	6.1	7	10.3
Structural collapse	12	24.5	4	5.9
Falls, struck by object, contact with object	8	16.3	21	30.9
Stress	20	40.8	32	47.0
Totals	49	100.0	68	100.0
Nature of fatal injury				
Burns and smoke inhalation	3	6.1	0	0.0
Burns only	2	4.1	1	1.5
Smoke inhalation only	5	10.2	7	10.3
Wound, cut, bleeding	1	2.0	7	10.3
Fracture	15	30.6	13	19.1
Heart attack	22	44.9	32	47.1
Electrocution	1	2.0	2	2.9
Drowning	0	0.0	2	2.9
Inhalation of nonfire gases	0	0.0	1	1.5
Internal injury not classified above	0	0.0	3	4.4
Totals	49	100.0	68	100.0
Ages of fire fighters				
All deaths				
20 and under	0	0.0	7	10.3
21 to 25	5	10.2	5	7.4
26 to 30	5	10.2	6	8.8
31 to 35	9	18.4	6	8.8
36 to 40	3	6.1	6	8.8
41 to 45	7	14.3	7	10.3
46 to 50	5	10.2	7	10.3
51 to 55	7	14.3	5	7.4
56 to 60	6	12.2	6	8.8
over 60	2	4.1	13	19.1
Totals	49	100.0	68	100.0

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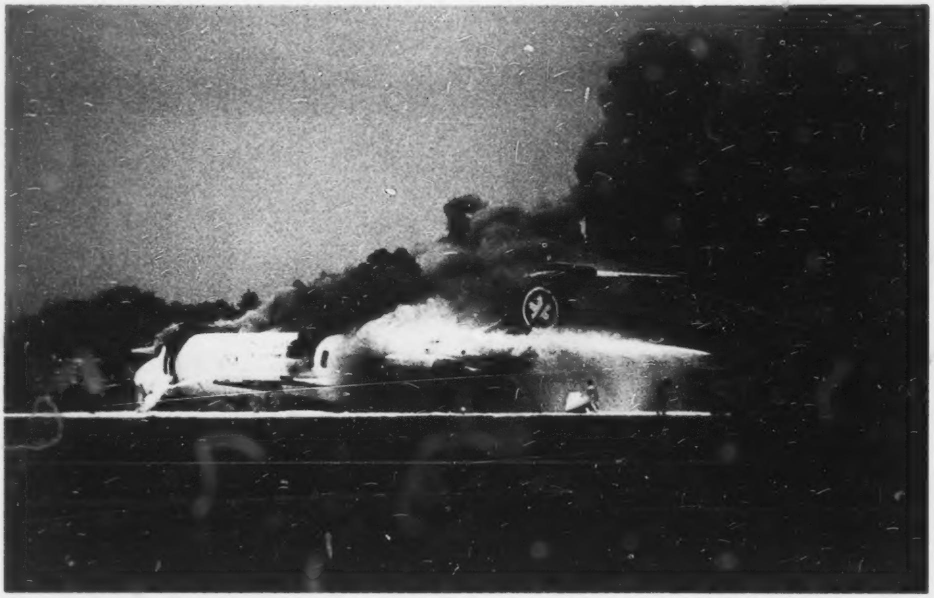
[a] For this report the term *volunteer* refers to any fire fighter who is not a full-time, paid member of a fire department.

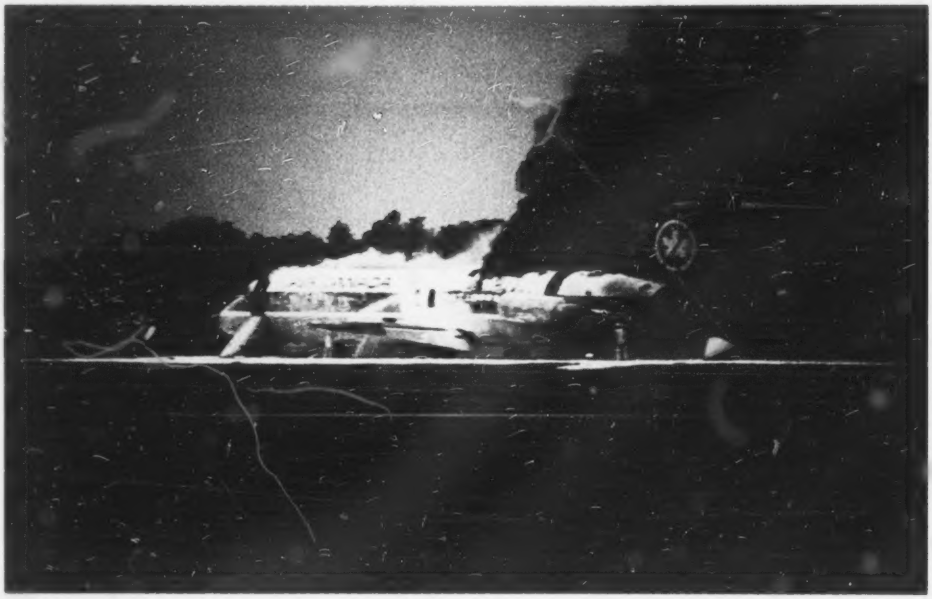
[b] Since these attributes are not mutually exclusive, totals and percentages are not shown.

1983 . . . A Closer Look



Top — On June 2, crash rescue units attack a cabin fire aboard an Air Canada DC-9 that made an emergency landing at Cincinnati Airport.

Bottom — The hot fire vents itself through the roof of the cabin, but it was already too late for 23 passengers. (Tim Smith, Black Star photos)



CALIFORNIA FIRES

Upper left — In Orange County, fire fighters attack a heavily involved attic in a single family home. (Larry Ford photo) Upper right — Six fire departments fight a Santa Fe Springs chemical fire involving 500,000 drums of solvents and chemicals that spilled into a flood control channel and flowed to the Pacific, closing beaches for two weeks and killing thousands of fish. (Mike Meadows photo)

Bottom — A liquefied petroleum gas tank truck vents on the Long Beach Freeway after a collision with another truck. Long Beach fire fighters decided to let the tanker burn itself out. There were no injuries. (Mike Meadows photo)

LOS ANGELES FIRES

Upper left — Donning breathing apparatus, fire fighters enter an office building already heavily involved in smoke. Eight fire fighters were hospitalized because of smoke inhalation and heat exhaustion. The outside temperature was 100°. Upper right — Six companies try to control a fire in a one-story wood frame commercial building. (Mike Meadows photos)

Lower left — Over 25 companies try to control fire in a railway warehouse. The wood structure was a total loss along with several trailer trucks parked at the loading doors. Lower right — Over 20 companies fought this "major emergency" fire at a lumber company. One fire fighter was killed. (Mike Meadows photos)

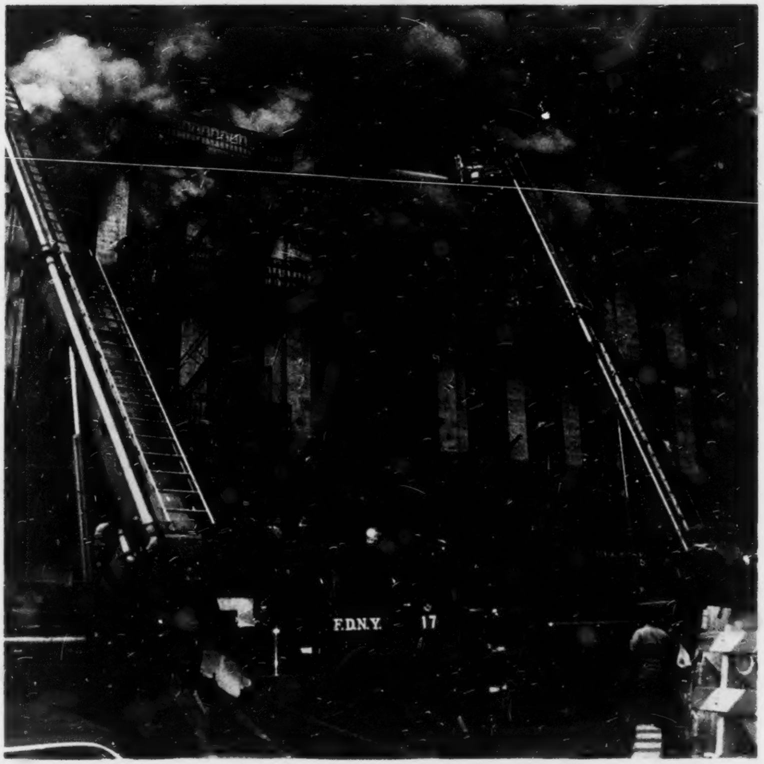
At one o'clock in the morning on July 29, 1983, this five-alarm warehouse fire in Detroit, Michigan almost turns night into day. The contents and the building were a total loss. (Bill Elsner photos)

In Detroit on June 28, two hours after a fire station only two blocks away closed, fire fighters prepare to fight a garage fire that extended to two adjacent houses. (Bill Eisner photo)

On the first day of Spring, residents quickly gathered their belongings and hastily exited this large apartment complex in Dallas, Texas. The fire started in an unoccupied apartment and quickly spread into the attic and along the roof. There were losses in 125 of 824 apartments in the six buildings. Untreated wood shingles were a contributing factor to the $5 million loss. (Photo by Freddie Spainhouer of the Dallas Fire Department)

FIRE IN THE BRONX, NEW YORK CITY
Left — A fire fighter descends the ladder after venting windows at a fire in a two-story, brick private residence.

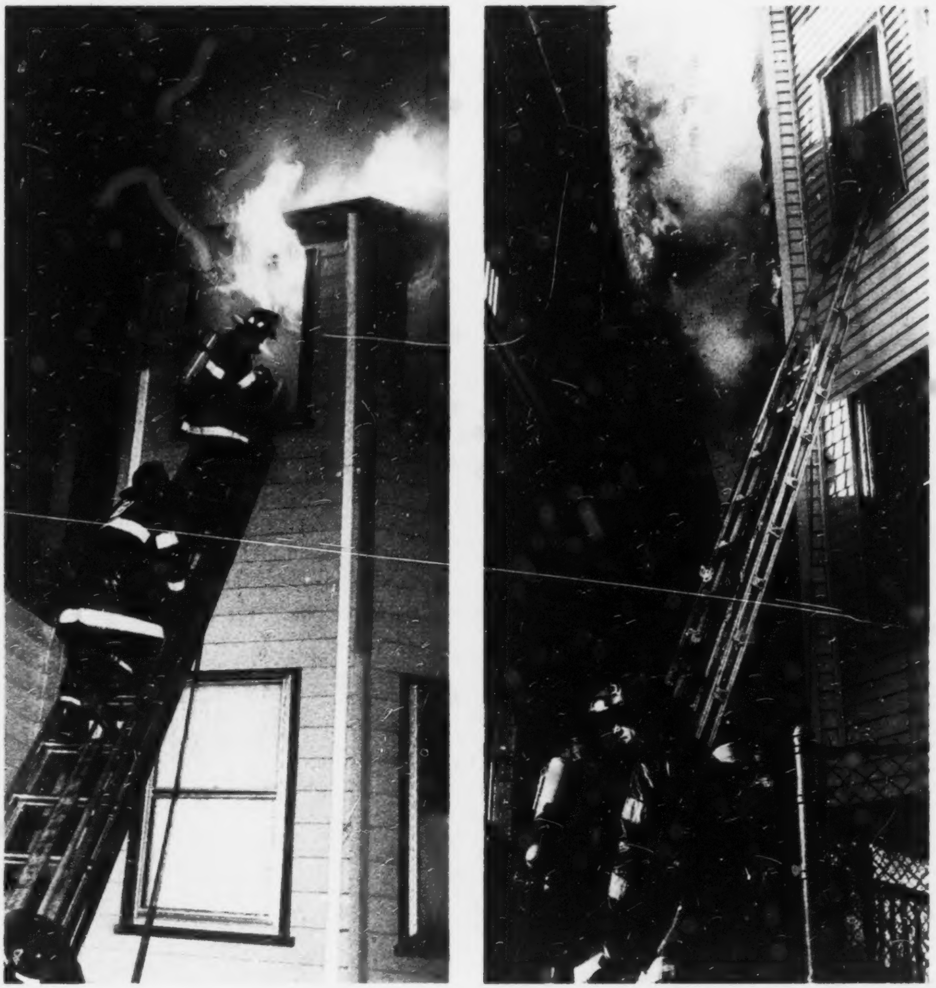
Bottom — A two-alarm fire in a lumber and plastics supply warehouse created a severe toxic smoke condition. Units were withdrawn a half block away to set up an exterior attack because of the smoke. (Harvey Eisner photos)



Top — In Harlem, NYC, this four-alarm fire was located adjacent to the firehouse of Engine 36. A backdraft in the early stages of this suspicious fire injured one fire fighter with flying glass. (Harvey Eisner photo)
Bottom — In Paramount, California, Los Angeles County fire fighters use an aerial ladder to battle a stubborn fire in a series of one-story commercial buildings. The fire was brought under control in three hours. (Mike Meadows photo)

Top — On February 19, 1983, a general alarm fire destroyed this three-story wooden apartment building in Bradford, Pennsylvania. City fire fighters rescued 11 occupants from the second and third floors. Two fire fighters were injured.

Left — In the town of Dayton, N.Y., a gas well fire burned out of control for 31 hours before being put out by 1,000 fire fighters from 65 departments. Eight fire fighters were injured. (Jay K. Bradish photos)



MASSACHUSETTS FIRES

Left — It was a cold day on December 12, 1982, when fire in a large 2½-story rooming house in Cambridge required four alarms to extinguish. Here fire fighters back out of a second floor window as the room becomes fully involved. (Bill Noonan photos)

Right — On March 17, 1983, this three-alarm fire in Boston started to jump from one three-story, wooden apartment house to the one next door. The fire fighters are waiting for their hose line to be charged so they can halt the spreading fire.

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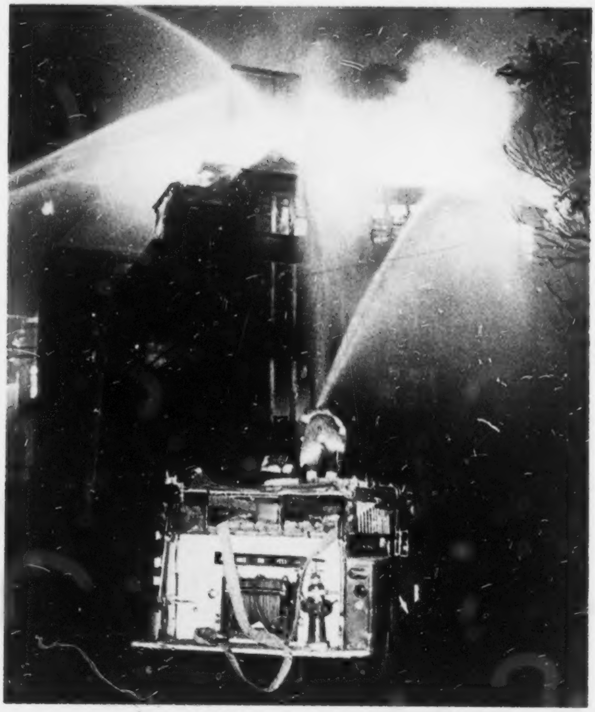
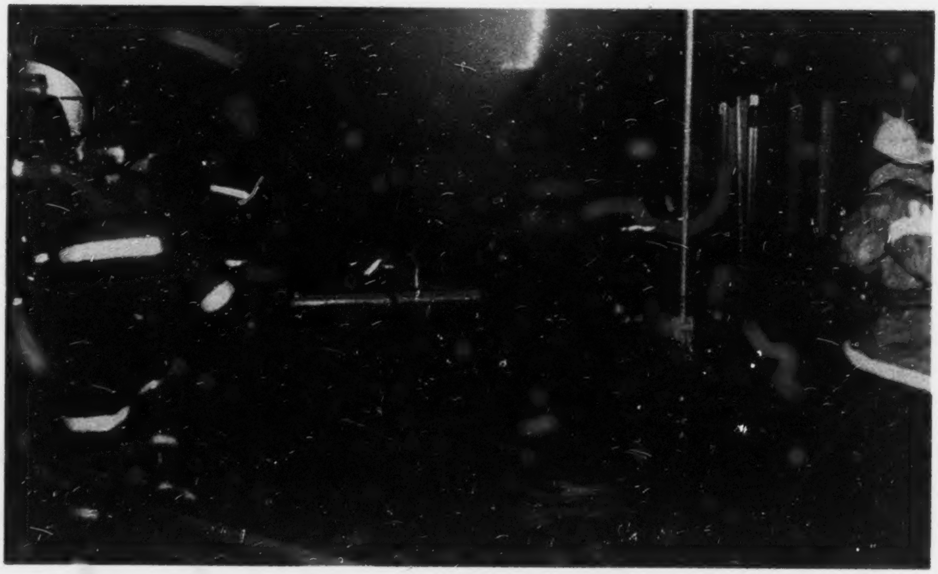
Top — In Boston on January 17, 1983, fire fighters used the fire escape to battle a fire in a four-story brick building. The third floor housed the Boston Sparks Association, an organization of fire buffs whose antique fire equipment and memorabilia were destroyed.

Bottom — Earlier the same month, on January 13, fire fighters in Chelsea forced their way into the rear entrance of a block of stores. The arsonist was convicted. (Bill Noonan photos)



Top — Several master streams of water are applied to an Everett fire. This five-alarmer involved a vocational high school that was being renovated into housing for the elderly. The old school burned for more than a day and was a total loss. Later investigation showed this fire to be of incendiary origin. (Bill Noonan photo) Bottom — In Salem, Wisconsin, on May 18, 1983, fire fighters rushed to the aid of other volunteers injured when a wall collapsed upon them. (Claire Riesselmann, Salem Volunteer Fire Department)



Top — Rare oriental rugs were stored in this barn which dates from early in this century. On April 9, 1983, Middleton, Massachusetts fire fighters responded to the pre-dawn two-alarm blaze. (Jim Pothier photo)

Bottom — Maine fire fighters also lost a barn in the middle of the night. This barn was more than a century old. (Eliot Fire Department)

between career and volunteer fire fighters, 1982

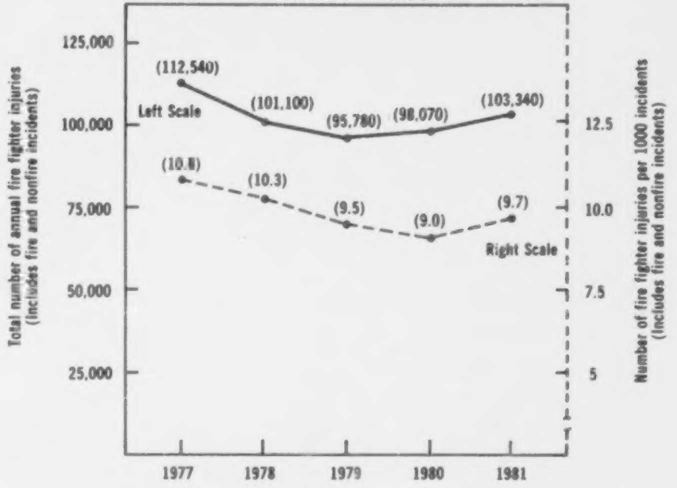
	Career		Volunteer[a]	
	Number of deaths	Percent of deaths	Number of deaths	Percent of deaths
Ages of fire fighters				
Deaths from heart attacks only				
26 to 30	1	4.5	1	3.1
31 to 35	1	4.5	1	3.1
36 to 40	2	9.1	2	6.3
41 to 45	5	22.7	6	18.8
46 to 50	2	9.1	5	15.6
51 to 55	4	18.2	5	15.6
56 to 60	6	27.3	5	15.6
over 60	1	4.5	7	21.9
Totals	22	100.0	32	100.0
Fire ground deaths by fixed property use				
Public assembly	3	8.8	1	2.9
Residential	11	32.4	14	40.0
Stores, offices	7	20.6	4	11.4
Manufacturing	4	11.8	4	11.4
Storage	2	5.9	4	11.4
Construction sites	0	0.0	1	2.9
Demolition sites	1	2.9	0	0.0
Vacant buildings	2	5.9	1	2.9
Idle buildings	1	2.9	0	0.0
Grass, brush, forest	2	5.9	4	11.4
Along pier	1	2.9	0	0.0
Public street	0	0.0	2	5.7
Totals	34	100.0	35	100.0
Rank				
Fire fighter	35	71.4	47	69.1
Company officer	11	22.5	11	16.2
Chief officer	3	6.1	10	14.7
Totals	49	100.0	68	100.0
Years of service				
5 or less	11	22.4	21	31.0
6 to 10	9	18.4	9	13.2
11 to 15	7	14.3	10	14.7
16 to 20	8	16.3	4	5.9
21 to 25	5	10.2	2	2.9
26 to 30	3	6.1	7	10.3
over 30	4	8.2	3	4.4
Not reported	2	4.1	12	17.6
Totals	49	100.0	68	100.0
Attributes of fire ground deaths[b]				
Incendiary/suspicious fires	14		7	
Search/rescue operations	5		3	
Vacant buildings	2		1	
Motor vehicle accidents	5		18	
False alarms	0		0	

The increase in deaths among volunteer fire fighters while responding or returning is also reflected in the increase in the cause of injury category (falls, struck by and contact with) and in the nature of injury categories (wound, cut, bleeding and fracture). There was little change from 1981 in the proportions of deaths by rank.

In 1982, the greatest proportion of deaths for both career and volunteer fire fighters occurred among those with 5 or fewer years of experience. Again in 1982, fire fighters with 10 years of service or less accounted for more than 50 percent of the volunteer deaths for which years of service were reported. The proportion of career fire fighter deaths in this interval rose from 33.3 percent in 1981 to 42.6 percent in 1982.

The ages of career fire fighters who died in 1982 ranged from 21 to 62 years, with a mean age of 42.1. For volunteer fire fighters, the ages ranged from 16 to 70 years with a mean age of 43.2 years. Seven fire fighters age 20 and under died in 1982; all were volunteers.

Total number of annual fire fighter injuries (left scale)
and number of fire fighter injuries per 100 incidents (right scale)
(Includes fire and nonfire incidents) by year (1977-1981)



Source: NFPA's Annual Survey of Fire Department for U.S. Fire Experience (1977-81)

Fire Fighter Injuries *

Annual Number of Fire Fighter Injuries and Injury Rates (1977-81)

The NFPA annually reports on fire fighter injury experience based on the NFPA survey of fire departments.[11,12,13] The total number of fire fighter injuries has shown a steady decrease during the 1977-79 period from 112,540 in 1977 to 95,780 in 1979, a decrease of 14.9 percent over the two-year period. However, the number of fire fighter injuries was on the upswing during the 1980-81 period, with increases in 1980 to 98,070 and in 1981 to 103,340. Examination of the number of fire fighter injuries per thousand incidents (includes fire and non-fire incidents) indicates a steady decrease during the 1977-80 period from 10.8 per thousand in 1977 to 9.0 per thousand in 1980, but an upswing in 1981 to 9.7 per thousand.

Other statistical measures for evaluating fire fighter injury risk indicate that for the

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* Data for 1982 fire fighter injuries was unavailable at presstime.

1977-81 period, there were 24.1 fire fighter injuries for every 1,000 fires attended, and that for the 1979-81 period, 11.4 percent of all fire fighter injuries resulted in admission to a hospital.

Fire Fighter Injuries by Type of Duty (1981)

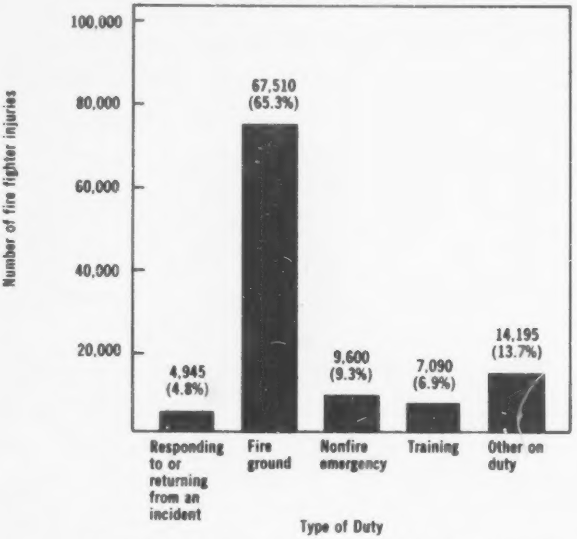
Results for 1981 included breakdowns on responding to or returning from an incident and at a non-fire emergency which in past surveys had been combined under one category, other incident related. Results indicate that once again, most fire fighter injuries — 67,510 or 65.3 percent — of all fire fighter injuries occurred during fire ground operations. Looked at another way, 23.3 fire fighters were injured for every 1,000 fires attended by fire departments nationwide in 1981.

Fire Fighter Injuries by Nature of Injury and Type of Duty (1981)

Results indicate that the three major types of injuries that occurred during fire ground operations in 1981 were: wound, cut, bleeding, bruise (27.0 percent); strain, sprain (24.4 percent); and smoke or gas inhalation (18.5 percent). The conscientious use of self-contained breathing apparatus and other protective equipment along with training and effective fire ground management would certainly help in a campaign to reduce inhalation injuries.

Results were quite consistent during all non-fire ground activities, with strains and sprains accounting for 43.3 percent of all non-fire ground injuries and wound, cut, bleeding, bruise accounting for 25.9 percent.

Fire fighter injuries by type of duty, 1981



Source: NFPA's Survey of Fire Departments for U.S. Fire Experience (1981)

Fire fighter injuries by nature of injury and type of duty, 1981

Nature of injury	Responding to or returning from an incident		Fire ground		Nonfire emergency		Training		Other on-duty	
	Number	Percent of	Number	Percent of	Number	Percent of	Number	Percent of	Number	Percent of
Burns (fire or chemical)	—	—	7,545	11.2	240	2.5	630	8.9	—	—
Smoke or gas inhalation	—	—	12,485	18.5	415	4.3	270	3.8	—	—
Eye irritation	270	5.5	5,315	7.9	290	3.0	465	6.6	680	4.8
Wound, cut, bleeding, bruise	1,345	27.2	18,235	27.0	2,530	26.4	1,655	23.4	3,750	26.4
Dislocation, fracture	350	7.1	2,[illegible]20	3.3	320	3.3	525	7.4	850	6.0
Stroke	0	0	[illegible]0	.1	0	0	0	0	30	.2
Heart attack	55	1.1	270	.4	70	.7	10	.1	165	1.2
Strain, sprain	2,355	47.6	16,530	24.4	4,495	46.8	2,895	40.8	5,755	40.5
Other	570	11.5	4,880	7.2	1,240	13.0	640	9.0	2,965	20.9
	4,945		67,510		9,600		7,090		14,195	

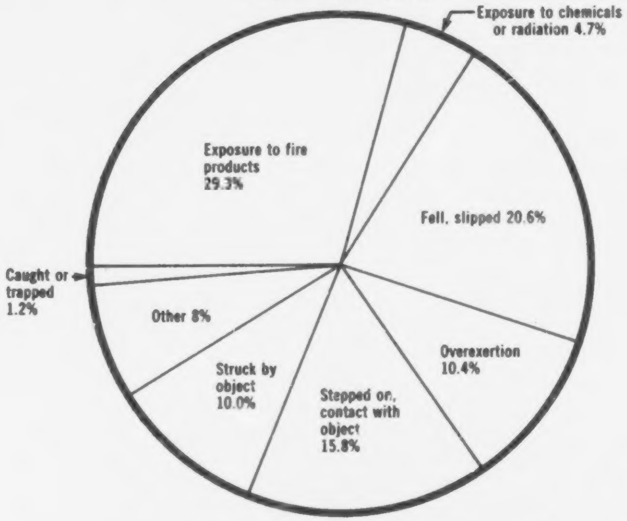
Source: NFPA's Survey of Fire Departments for U.S. Fire Experience (1981).
If a fire fighter sustained multiple injuries for the same incident, only the nature of the single most serious injury was tabulated.

Fire Ground Injuries by Cause (1981)

By nature, the hazardous profession of fire fighting leads to a high occurrence of fire ground injuries, and hence fire ground injuries by cause were examined.

Exposure to fire products was the cause of 29.3 percent of all fire ground injuries. Other major contributors to fire ground injuries were: fell, slipped (20.6 percent); stepped on, contact with object (15.8 percent); overexertion (10.4 percent); and struck by object (10.0 percent). (Cause refers to the initial circumstance leading to the injury.)

Fire ground injuries by cause*



Source: NFPA's Survey of Fire Departments for U.S. Fire Experience (1981)

*Cause refers to the initial circumstance leading to the injury.

Based on 55,259 injuries estimated with data from departments reporting this breakdown.

Average number of fire fighter injuries and injuries requiring hospitalization per department by population of community protected, 1981 (For all types of duty)

Population of community protected	Average number of injuries	Average number of injuries requiring hospitalization	Number of injuries requiring hospitalization per 100 injuries
500,000 to 999,999	308.28	15.00	4.87
250,000 to 499,999	231.60	14.07	6.08
100,000 to 249,999	73.43	5.46	7.44
50,000 to 99,999	28.92	3.25	11.24
25,000 to 49,999	13.55	1.10	8.12
10,000 to 24,999	4.98	.71	14.26
5,000 to 9,999	2.67	.29	10.86
2,500 to 4,999	1.40	.18	12.86
Under 2,500	.51	.08	15.68

Source: NFPA's Survey of Fire Departments for U.S. Fire Experience (1981).

Average Total Injuries and Average Injuries Requiring Hospitalization per Department by Population Protected (1981)

The average number of injuries per department by population protected is in the second column of the table above. The average ranged from a high of 308.28 injuries for departments that protect communities of 500,000 to 999,999 to a low of .51 injuries for departments that protect communities of less than 2,500 population. Overall, the larger the community protected, the higher the number of fire fighter injuries.

The average number of injuries requiring hospitalization per department by population protected is presented in the third column of the table. For departments that protect communities with populations of 25,000 or more, the average ranged from a high of 15.00 injuries for departments that protect communities of 500,000 to 999,999, to a low of 1.10 injuries for departments that protect communities of 25,000 to 49,999 population. For departments that protect communities of less than 25,000 population, the average number of injuries requiring hospitalization was less than 1 for all groupings.

The number of injuries requiring hospitalization can be related to the total number of injuries that occur for a department. The severity of injuries for departments that protect communities of different sizes can then be compared more directly. The number of injuries requiring hospitalization per 100 injuries by population protected is presented in the fourth column of the table. The hospitalization injury rates ranged from a high of 15.68 for departments that protect communities of less than 2,500 population to a low of 4.87 for departments that protect communities of 500,000 to 999,999, a reversal in position from the average hospitalization injury tabulation. The high rates of injuries that require hospitalization for departments that protect smaller communities may be in part due to the fact that these departments for the most part respond to proportionally (percentage of fire incidents to total incidents) more fires than departments that protect larger communities. Thus, it is important to consider both hospitalization injuries expressed as a proportion of total injuries and average hospitalization injuries when examining results by population protected.

Average Fires and Average Fire Ground Injuries per Department by Population Protected (1981)

These results seem to indicate (1) that the number of fires a fire department responds to is directly related to the population protected, and (2) that the number of fire ground injuries incurred by a department is directly related to its exposure to fire, i.e., the number of fires attended by the department. These points are not surprising. The second point is demonstrated clearly when the range of the statistic is examined: from a high of 307.9 for departments that protect communities of 500,000 to 999,999 population to a low of .4 for departments that protect communities of less than 2,500 population.

A useful way to look at fire fighter injury experience and to obtain a reading on the relative risk that departments face is to examine the number of fire ground injuries that occur for every 100 fires. This takes into account relative fire experience and allows more direct comparison between departments that protect communities of different sizes. The number of fire ground injuries per 100 fires is displayed in the fourth column of the table below. The overall range of the rates varied little, from a high of 4.3 fire ground injuries per 100 fires for departments that protect communities of 500,000 to 999,999 population to a low of 2.0 for departments that protect communities of 10,000 to 24,999 population. Thus, the considerable range noted in average fire ground injuries by population protected virtually disappears when relative fire experience is taken into account.

Average number of fires, and fire ground injuries per department and injuries per 100 fires by population of community protected

Population of community protected	Average number of fires	Average number of fire ground injuries	Number of fire ground injuries per 100 fires
500,000 to 999,999	7,091.4	307.9	4.3
250,000 to 499,999	4,427.7	162.4	3.7
100,000 to 249,999	1,836.1	43.9	2.4
50,000 to 99,999	754.7	18.0	2.4
25,000 to 49,999	370.6	8.5	2.3
10,000 to 24,999	174.5	3.5	2.0
5,000 to 9,999	78.2	1.9	2.4
2,500 to 4,999	43.7	1.1	2.5
Under 2,500	19.0	.4	2.1

Source: NFPA's Survey of Fire Departments for U.S. Fire Experience (1981).

Average Fires and Average Fire Ground Injuries per Department by Population Protected and Region of the Country (1981)

The results for each region of the country shown in the table below indicate that the number of fires a fire department responds to is directly related to the population protected, and that the number of fire ground injuries incurred by a department is directly related to the number of fires experienced. The Northeast reported a substantially higher number of fire ground injuries for departments that protect virtually all community sizes, except for departments that protect communities of 2,500 to 4,999 people.

The table below also shows the number of fire ground injuries per 100 fires by population protected and by region of the country. The Northeast had higher rates than the other regions for departments that protect communities of all sizes. Thus, even when the relatively high fire experience of the Northeast is taken into account, this region still had higher fire ground injury rátes than the other regions.

Average number of fires, and fire ground injuries per department, and injuries per 100 fires by population of community protected and region of the country

Column 1: Average reported number of fires
Column 2: Average reported number of fire ground injuries
Column 3: Number of fire ground injuries per 100 fires

Population of Community Protected	Northeast			Northcentral			South			West		
	Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	Col. 3	Col. 1	Col. 2	Col. 3
500,000 to 999,999	—	—	—	—	—	—	7,906.4	326.2	4.1	—	—	—
250,000 to 499,999	7,302.3	517.3	7.1	3,909.3	139.7	3.6	3,938.1	101.9	2.6	4,403.3	87.3	2.0
100,000 to 249,999	3,557.0	133.0	3.7	1,522.0	53.3	3.5	1,857.7	31.9	1.7	1,353.1	22.5	1.7
50,000 to 99,999	1,211.3	47.8	3.9	614.3	14.1	2.3	855.7	12.4	1.5	540.7	10.6	2.0
25,000 to 49,999	553.6	17.1	3.1	318.4	8.9	2.8	401.1	6.7	1.7	298.2	5.1	1.7
10,000 to 24,999	219.1	6.3	2.9	147.9	3.1	2.1	201.0	2.7	1.3	141.6	2.6	1.8
5,000 to 9,999	93.3	3.1	3.3	59.8	1.6	2.7	89.1	1.5	1.7	79.1	1.8	2.3
2,500 to 4,999	41.1	1.3	3.2	35.7	.8	2.2	57.0	1.4	2.5	55.3	1.0	1.8
Under 2,500	18.1	.7	3.9	16.3	.3	1.8	29.7	.5	1.7	16.3	.3	1.8

Source: NFPA's Survey of Fire Departments for U.S. Fire Experience (1981).
Note that for the Northeast, Northcentral and West regions, there was an insufficient number of departments reporting statistics in the 500,000 to 999,999 category.

References

[1] Arthur E. Washburn and David W. Harlow, "United States Fire Fighter Deaths in the Line of Duty During 1978," *Fire Command*, Vol. 46, No. 5 (May 1979), pp. 11-18.

[2] Arthur E. Washburn, David W. Harlow and Sylvia Hom, "United States Fire Fighter Deaths in the Line of Duty During 1979," *Fire Command*, Vol. 47, No. 5 (May 1980), p. 30.

[3] Arthur E. Washburn, David W. Harlow and Sylvia Hom, "1980 United States Fire Fighter Deaths in the Line of Duty," *Fire Command*, Vol. 48, No. 5 (May 1981), p. 12.

[4] Arthur E. Washburn, David W. Harlow and Rita F. Fahy, "United States Fire Fighter Deaths — 1981," *Fire Service Today*, Vol. 49, No. 5 (May 1982), p. 12.

[5] Arthur E. Washburn, David W. Harlow and Rita F. Fahy, "U.S. Fire Fighter Deaths - 1982," *Fire Service Today*, Vol. 50, No. 5 (May 1983), pp. 15-26.

[6] International Association of Fire Fighters, "1979 Annual Death and Injury Survey," *International Fire Fighter*, November 1980.

[7] R. James Barnard, "Heart Disease in Fire Fighters — Parts 1 and 2," *Fire Command*, Vol. 46, Nos. 8,9 (August, September 1979), pp. 52-55, 34-36.

[8] Sylvia Hom, "Breathing apparatus and fire fighter deaths — Parts 1 and 2," *Fire Command*, Vol. 47, Nos. 6,7 (June, July 1980), pp. 24,22. In addition, see "The Role of Breathing Apparatus in Fire Fighter Deaths," by Sylvia Hom, a report submitted to the National Institute for Occupational Safety and Health by the NFPA, March 1980.

[9] According to Dr. R. James Barnard, the stress of fire fighting includes an emotional stress indicated by "extremely high heart rates recorded immediately after the alarm, during the anticipation phase while riding on the truck, and for prolonged periods during actual fire fighting," in addition to thermal stress. "Heart disease in fire fighters — Part 1," *Fire Command*, Vol. 46, No. 8, (August 1979), p. 54.

[10] Michael J. Karter, Jr., "Fire Loss in the United States During 1981," *Fire Journal*, Vol. 76, No. 5 (Sept. 1982), p. 68.

[11] Michael J. Karter Jr., "Fire fighter injuries in the United States during 1979," *Fire Command*, Vol. 47, No. 12 (December 1980), p. 25.

[12] Michael J. Karter Jr., "U.S. fire fighter injuries — 1980," *Fire Service Today*, Vol. 48, No. 12 (December 1981), p. 16.

[13] Michael J. Karter Jr., "U.S. fire fighter injuries — 1981," *Fire Service Today*, Vol. 49, No. 12 (December 1982), p. 15.

Additional Reading

"A Study of Occupational Injuries and Illnesses Among Firefighters" prepared by Safety Sciences, Division of Syncor International, San Diego, California, May 1980. Prepared for the Federal Emergency Management Agency, U.S. Fire Administration.

Safety Programs for Fire Fighters

Fire fighting is an inherently dangerous activity. Fire fighter deaths have historically numbered in the hundreds, and injuries in the tens of thousands, annually. Many of these injuries and deaths are needless and could be avoided by adherence to a carefully administered safety program. (See "Fire Fighter Deaths and Injuries" that precedes this article.)

Regardless of the size of the department, the costs associated with the development and implementation of a fire department safety program are minimal, particularly when compared to the direct and indirect costs associated with even a single serious injury or death. Fire departments that have identified those costs are able to easily justify the expenditures of funds for safety programs and equipment. Unfortunately, such departments are presently in the minority.

Safety is primarily a management responsibility in any organization, including the fire service. Although the responsibility for fire fighter safety falls upon management, the development and implementation of a program often involves the active participation of personnel at all levels within the organization.

Management should:

- Establish and promote safety policies.
- Assign competent supervision (safety officer).
- Provide an environment free from recognizable hazards.
- Delegate authority.
- Provide safety training education.
- Investigate accident causes.
- Provide safety inspections.
- Maintain accident records and statistics in accordance with state and federal regulations.
- Provide continuing support for safety programs.

A 22-year-old New Jersey volunteer fire fighter was killed while fighting this fire in the New Milford (N.J.) Municipal Building, January 17, 1983. While fire fighters set up hoses, he apparently went alone to the attic to fight the fire at its source. There he was felled by heavy smoke, collapsed, and died in the fire. (Hackensack, NJ Record)

In addition to defining duties, responsibilities, and a general standard of conduct for personnel, a safety program must also address individual accountability for adherence to behavior patterns outlined in the program. This can take the form of incentives for the reduction or lack of accidents, or punitive actions for ignoring or disregarding safety measures.

Individual attitudinal problems that can compound the safety problem are:

- Taking an unsafe position at the fire ground.
- Acting without authority.
- Being absent-minded, impatient, or reckless.
- Being out of shape (physically).
- Failing to use or properly maintain protective equipment.

The ultimate success of a safety program results from policy promulgation and attitudinal change. When operating safely becomes an unconscious effort on the part of department personnel, then success has been achieved. All that remains is continual program maintenance and reinforcement.

The environment in which the U.S. fire fighter works varies widely. Although most injuries and deaths occur on or as a result of fire ground activity, routine activity such as vehicle operation, training activities, and station maintenance account for a substantial number of injuries and deaths. In many respects, these activities are more controllable and thus lend themselves to safety techniques used by vehicle fleet programs and industrial safety programs. Fire ground safety, however, represents unique safety problems, where service injuries can only be limited by the implementation of standard operating procedures and effective fire ground management.

Elements of a Safety Program

Protective Equipment

The safety program should include standards for protective equipment and the appropriate use and maintenance of each piece of personal safety equipment. The concept of protective equipment as a system needs to be emphasized; i.e., protective equipment consists of a variety of components, each of which represents an integral part of a total protection package, and a failure to correctly use all components of the system negates the total protection afforded by a complete protective system. This system must provide complete body protection from the effects of smoke, heat, toxic gases, moisture, puncture, impact, and electrical shock. This level of protection can only be achieved by the proper combination of SCBA, helmet, hood, face shield, turnout coat, trousers, gloves, and boots. Equipment that meets or exceeds current regulations or consensus standards should be used. OSHA regulations (29 CFR 1910.156, Subpart L) and NFPA standards (NFPA 1971, 1972, 1981) for protective equipment provide guidance for selecting equipment that meets the minimum protective requirements for effectively combatting contemporary fire problems.

Fire departments insisting on mandatory use of SCBA and protective clothing that meet current standards have a reduced injury and death rate, as well as a more conducive environment for aggressive fire attack. This protective equipment is usually purchased by the fire department, required to be worn at all times, and maintained in a ready condition by an organized preventive maintenance and replacement program.

Certain safety problems are solved using protective equipment designed for specific hazards. Unusual atmospheres that result from hazardous materials incidents require protection from dangerous vapors that can only be maintained using special chemical suits and SCBA together. Large flammable liquid fires and aircraft incidents may require the special protection provided by reflectorized proximity and/or entry suits. Unusual rescue situations may require special equipment such as life vests, exposure and wet suits, and disposable contamination clothing. Some hazards require the use of specific accessory equipment, for example, the use of linesman gloves and specially designed electrical "hotsticks" for dealing with electrical emergencies.

Accident Investigation and Records

Adequate investigation of an accident provides the basis for medical, insurance, and legal considerations, as well as a method to determine underlying causes for the accident. The results of the investigation can be used to evaluate or improve a fire department safety program. An analysis of accident investigation records can provide a means for tracking both the direct and indirect costs associated with any injuries. Thorough investigation can provide the answers to questions regarding unsafe actions or a breech of safety policies by the accident victim.

All injuries are important and should be documented for both legal and departmental reasons. Accident documentation can serve as a reminder that the potential for injury or death is real, and that all personnel are subject to injury or death when they do not operate in a safe manner or do not adhere to safety regulations. (The NFPA publication, *SCBA, A Guide for the Selection, Use, Care and Maintenance of SCBA* outlines investigative protocols for fire ground respiratory injuries.)

Apparatus Operational Safety

According to General Motors Corporation, untrained drivers cost fire departments five times more money per collision than trained drivers. In addition, fire department vehicles must be equipped with minimum safety equipment as outlined by state and federal regulations, as well as NFPA 1901, *Standard for Automotive Fire Apparatus.*

Apparatus operational safety can be divided into a number of areas: driver/operator training, vehicle maintenance and safety, and personnel safety. Driver/operator safety includes both a thorough knowledge of the legal requirements for the operation of the size and type of apparatus used by the department, and the motor vehicle regulations as they apply to emergency vehicles in the respective state. Minimum training for fire department drivers should include the U.S. Department of Transportation Defensive Driving Course and successful completion of an apparatus rodeo course, that measures the driver's ability to maneuver the vehicle through a series of stations simulating common vehicle movements as well as driver competence. Procedures for backing apparatus in tight quarters or at busy emergency scenes should emphasize driver/observer coordination and personnel safety. Back-up alarms also provide a degree of personnel safety. Driver/operator safety standards are referenced in NFPA 1002, *Standard for Fire Apparatus Driver/Operator Professional Qualifications* and have a direct bearing on apparatus operation safety.

Adequate vehicle design and preventive maintenance is the second area of the apparatus operations safety program. The safety of fire service personnel as well as the civilian population depends on well-maintained and dependable emergency vehicles. The rated gross vehicle weight of apparatus should not be exceeded since overloading adversely affects the braking, stability, and performance of the vehicle.

Drivers should be involved in preventive maintenance programs to insure a working knowledge of the vehicle's components, as well as the ability to recognize and possibly troubleshoot potential maintenance and safety problems.

The third area of apparatus operational safety concerns personnel safety in regard to apparatus operations. Fire fighter injury and death surveys annually report the result of inadequate policies for fire fighter safety while boarding, riding, or disembarking from apparatus. Fire fighters should be seated and confined by seat belts whenever the vehicle is in motion. Where apparatus is not equipped with sufficient seating for personnel, then the numbers of personnel allowed to respond should be limited, or safety harnesses or hardware provided. Many injuries and deaths have also been sustained when personnel attempt to mount a moving vehicle, ride without proper protective equipment, or prematurely leave the vehicle before it has completely stopped. Unfortunately, many of these accidents are not even associated with emergency responses, but are sustained while the vehicle is involved in non-emergency situations.

In-Station Safety

In-station safety is an area where considerable control can be exercised. Because most in-station activity is of a non-emergency nature and some areas of the fire station are similar to areas in industrial or institutional facilities, development of an in-station safety program should be a relatively simple task. In reality, however, many fire stations are poor examples of good firesafety. Since the fire service is a major promoter of safety, each organization should routinely review its own fire and safety status. A safety audit using standard OSHA criteria (see 29 CFR 1910) as well as the community's own firesafety regulations will often reveal a significant number of physical problems, as well as a few poor safety procedures used by fire department personnel. Common areas for concern are: storage and handling of flammables, workshop safety, exit requirements, tripping and storage problems, inadequate electrical equipment, and a lack of built-in fire protection features.

Fire Ground Safety

The vast majority of fire fighter injuries or deaths occur annually on the fire ground or emergency scene. It is ironic that the organization which is called upon to respond and mitigate other's emergencies, does so in such a way that it injures or kills its own personnel at a phenomenal rate. Fire fighting is a dangerous activity, but that danger is often compounded by a lack of concern for, or application of, fire ground safety principles. In general, the fire ground must be managed in a more professional and systematic manner if

Several fire fighters wearing heavy protective clothing in 90°F plus heat were hospitalized for heat exhaustion suffered while fighting this fire in a 100-year-old Connecticut barn in June 1983. (Syd Greenberg) the fire fighter death and injury rate is to be reduced. Good planning and organization should help ensure that fire fighters perform their tasks safely and efficiently on the fire ground.

Immediately following size-up, the fire ground commander must evaluate the fire, determine what resources are needed to fight it, and call for additional resources if required. Then the commander must develop an organizational structure based on planned operating procedures, and must also implement strategic control measures.

Good communications are necessary for safe and effective fire fighting operations. This means a well-organized dispatch system; two-way radios in each emergency vehicle; battery-powered portable megaphones or vehicle-mounted public address systems; portable two-way radios for individuals; and a messenger system.

Sectoring reduces the number of persons reporting to command. It allows the commander to concentrate on overall strategy, coordinate all fire ground operations, and best allocate resources. Sector officers control the functions assigned to their commands. Sectoring should be considered when several units are operating on the fire ground or when direct control of certain operations is needed. Sectoring should be organized according to an established system. A safety sector should always be created at large working fires or multiple alarms.

A standard personnel identification system should be developed that helps officers account for the location of units and personnel at all times.

Fire departments must be prepared to deal with fatigue at the fire ground. Everyone should learn to recognize the signs of fatigue. If possible, exhausted units should rest and refresh themselves at rehabilitation sectors. When heat, cold, or lengthy operations are factors, personnel should be rotated with fresh and rested crews on a regular basis. Relieved fire fighters should be checked by emergency medical technicians (EMTs) or paramedics. Personnel will suffer less fatigue on the fire ground if they exercise regularly as part of a physical fitness program.

Tactical plans should be developed for unusual situations such as those involving electrical problems, hazardous materials, and ground cover fires. Departments should learn which hazardous materials are found in their communities, collect information and expert advice concerning those materials, and be equipped to deal with them safely. Wind conditions, established escape routes, and proper tactics are especially important in fighting ground cover fires.

A system should be required when fire fighters need to evacuate the involved building or area. This should include an evacuation alert announcement and means of accurately accounting for all personnel once they leave the endangered area. Evacuations can be tactical withdrawals, allowing fire fighters to move equipment to safety, or can occur under conditions so serious that equipment should be abandoned. A fire ground perimeter will help personnel determine where they will be safe.

All the elements of fire ground safety should be practiced during training sessions since simulated fire and rescue situations account for a significant number of fire fighter deaths and injuries annually. Training sessions for fire and emergency situations should be the place to emphasize as well as practice safe operations.

Fire Fighter Health and Fitness

The health and fitness of fire fighters should be the prerequisite for any safety program. The physical condition of individual personnel will have a direct effect on their aerobic capacity, and consequently, on the condition of their hearts and circulatory systems. Since fire fighting is excessively demanding on these body components, a high level of fitness will significantly reduce the chances of cardiovascular problems, an area of growing concern among fire service personnel.

Health maintenance programs aimed at reducing the risk of heart-related as well as other forms of injuries have, unfortunately, been adopted by less than 20 percent of all fire departments. Improved initial medical screening and periodic medical examinations, together with individualized physical fitness training have shown and will continue to show significant reduction in risk potential for serious injury and death. Supplemental educational programs in the area of weight control, nutrition, smoking, and coping with stress will have a collective effect in providing a support mechanism to improve fire fighter safety.

The general good health and fitness of the individual fire fighter will usually have a positive effect on his mental attitude, a factor that can have a positive effect on accident potential. Fire fighters who are physically fit are also less likely to sustain serious injuries when involved in accident situations, and are prone to recover faster from injuries.

Establishing a Safety Officer

The safety officer is a significant position in any fire department. The safety officer acts as an overseer of the department safety consciousness and should have direct access to the chief executive officer of the department in regard to recommendations in occupational health and safety matters. NFPA Standard 1501, *Fire Department Safety Officer*, provides minimum duties and responsibilities of the safety officer. He is responsible for recommending and implementing a department safety program designed to: prevent loss of life or injury, identify and correct dangerous practices, assure proper maintenance of equipment, and prevent equipment loss and damage.

The safety officer alone, or acting as the chairman of a safety committee, should make recommendation to eliminate unsafe practices, manage periodic testing of fire fighting and personnel safety equipment, instruct or delegate instruction of personnel in safe work methods and the training and testing of drivers of emergency vehicles, and maintain records and statistical data on all fire department job-related injuries and occupational diseases or fatalities. The safety officer can be the catalyst for a well run safety program. A well-balanced and representative safety committee may provide the forum needed for valuable input as well as orderly implementation.

Resources for Safety Programs

American National Standards Institute (ANSI)
1430 Broadway
New York, NY 10018
ANSI Standard 288.5, Practices for Respiratory Protection for the Fire Service

Department of Transportation
Washington, DC
or State DOT
Defensive Driving Course (8 Hours)

International Association of Fire Fighters
Occupational Health & Safety Division
1750 New York Ave., NW
Washington, DC 20006
Life Support
Line to Safety (AV manual)
Minimum Standards for Fire Fighter Protective Clothing And Equipment
Occupational Cancer and the Fire Fighter
Thermal Stress and the Fire Fighter
Health and Safety Contract Information
Aerial Device Testing and Certification Program (AV program and text)
Occupational Noise and Safety

International Fire Service Training Association
Fire Protection Publications
Oklahoma State University - Fire Building
Stillwater, OK 74078

Books
- IFSTA 106, *Fire Apparatus Practices*
- IFSTA 209, *Fire Fighter Occupational Safety*

National Fire Protection Association
Batterymarch Park
Quincy, MA 02269

Standards
- NFPA 1002, *Standard for Fire Apparatus Driver/Operator Professional Qualifications*
- NFPA 1501, *Standard for Fire Department Safety Officer*
- NFPA 1901, *Standard for Automotive Fire Appartatus*
- NFPA 1971, *Standard for Protective Clothing for Structural Fire Fighting*
- NFPA 1972, *Standard for Structural Fire Fighter's Helmets*
- NFPA 1973, *Standard on Gloves for Structural Fire Fighters*
- NFPA 1981, *Standard for Self-Contained Breathing Apparatus for Fire Fighters*
- NFPA 1982, *Standard on Personal Alert Safety Systems (PASS) for Fire Fighters*

Books
- *Safety in the Fire Service*, Soros
- *SCBA: A Guide to the Selection, Use, Care and Maintenance of SCBA*, Teele, Greenawalt, Persson
- *Physical Fitness and Public Safety*, Jacobs

Slide/Tape Programs

Fire Fighter Safety Series
- Safety 1: *Danger! Fire Fighter at Work*
- Safety 2: *The Fire Department Safety Program*
- Safety 3: *Organizing the Fire Ground*
- Safety 4: *Fire Ground Operations*
- Safety 5: *Protective Clothing and Breathing Apparatus*
- Safety 6: *The Basic Fire Fighting Machine*
- Safety 7: *Emergency Vehicle Operations*
- Safety 8: *Structural Collapse*

Fire Command Series
- Fire Command 1: *The Fire Command System*
- Fire Command 2: *Fire Ground Factors*
- Fire Command 3: *Tactical Priorities*
- Fire Command 4: *Rescue*
- Fire Command 5: *Fire Control: Offensive Attack*
- Fire Command 6: *Fire Control: Defensive Attack*
- Fire Command 7: *Property Conservation*
- Fire Command 8: *Fire Stream Management*
- Fire Command 9: *Support Activities*
- Fire Command 10: *Staging and Apparatus Placement*
- Fire Command 11: *Command Procedures*
- Fire Command 12: *Sectoring and Company Functions*
- Fire Command 13: *Communications*

Periodicals
- "Annual Fire Fighter Death Survey" - June issue: *Fire Service Today*
- "Annual Fire Fighter Injury Survey" - December issue: *Fire Service Today*

Posters

Safety Posters: series of 6 safety posters for fire station use

National Safety Council
425 North Michigan Ave.
Chicago, IL 60611

The National Safety Council publishes many safety-related materials: organizing safety programs, supervisor's responsibilities for safety, and safety campaign material. The material is excellent for in-station safety, in particular.

OSHA Office of Publications
Room S1212
U.S. Dept. of Labor
Washington, DC 20210

National Fire Academy
National Emergency Training Center
16925 South Seton Ave.
Emmitsburg, MD 21727

Federal Benefits for Fire Fighters*

The Public Safety Officers' Benefits Act of 1976 provides a $50,000 federal benefit to the survivors of state and local fire fighters and law enforcement officers who die as the direct or proximate result of personal injury sustained in the line of duty on or after 29 September 1976. From October 1976 through July 1983, the Public Safety Officers' Benefits Program (PSOB) paid 408 claims to eligible beneficiaries of fire fighters. The payments totaled $18,700,000. This article summarizes the PSOB program coverage and eligibility requirements for paid and volunteer fire fighters.

Accidental and Fire-related Coverage

Under the Act, coverage extends to all actions which the paid or volunteer fire fighter is officially assigned to perform. Coverage is not limited to fire-related death, but also includes accidental duty-related death. Benefits have been awarded, for example, in claims arising out of training and community service accidents, such as electrocution while hanging a church banner or a fatal head injury sustained in a fall at the station house.

The Act is not workmen's compensation. Accordingly, there is no employer's responsibility. The benefits will not be paid if a fire fighter's death is a result of suicide, intentional misconduct, or voluntary intoxication. Nor will benefits be paid when a claimant's actions were a substantial contributing factor to the fire fighter's death.

The Act precludes coverage of deaths caused by heart or pulmonary diseases. Because of its importance, this limitation merits complete and detailed explanation.

Cardiac and Pulmonary Coverage

Deaths due to chronic, progressive, or congenital cardiac or pulmonary disease are not covered by the Act, unless a traumatic injury was a substantial factor in the death. "Substantial factor" means that the traumatic injury contributed to the death to as great a degree as any other factor, such as a pre-existing disease. Traumatic injury is defined as:

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* This updated article originally appeared in the January 1979 issue of *Fire Command*, "Federal Benefits for Fire Fighters," William F. Powers, Director, Public Safety Officers' Benefits Program, Office of the Comptroller, Office of Justice Assistance Research and Statistics, U.S. Department of Justice.

"A wound or other condition of the body caused by external force, including injuries inflicted by bullets, explosives, sharp instruments, blunt objects, or other physical blows, chemicals, electricity, climatic conditions, infectious diseases, radiation, and bacteria, but excluding stress and strain."

The most common traumatic injury suffered by a fire fighter whose death results from a heart or pulmonary condition is carbon monoxide poisoning due to smoke inhalation. Recognizing this, the Office of Justice Assistance Research and Statistics (OJARS) has established a minimum blood carbon monoxide (COhb) level that can be considered a "substantial factor" in a heart or pulmonary disease-related death. Most medical experts consider lethal COhb levels to be at the 30 percent or higher saturation level. After consulting with qualified physicians in the field, however, the OJARS determined that COhb levels of much less than 30 percent can be fatal. The agency, therefore, has set its COhb "substantial factor" standard at 10 percent saturation for nonsmokers and at 15 percent saturation for smokers.

The COhb standards set by the OJARS enhance the potential for coverage of fire fighters who suffer fatal heart or pulmonary attacks at a fire scene, or within a few hours of fighting a fire. There is, however, one important impediment to this enhanced coverage.

Frequently, when a fire fighter dies of a fatal heart or pulmonary attack, medical examiners and coroners will determine the death to be natural. They often fail to order an autopsy or toxicological analysis. The cause of death on the official certificate is then listed as a certain type of heart or pulmonary attack due to heart or pulmonary disease. This places the fire department in the position of attempting to prove that the fire fighter suffered smoke inhalation sufficient for coverage under the Act. Frequently, the only evidence submitted is that there was smoke at the fire. Such a statement cannot be accepted as a basis for coverage.

Departments must submit medical evidence of smoke inhalation. Accordingly, if a fire fighter dies of a heart or pulmonary condition, a toxicological analysis must be performed to determine the blood level of all toxic fumes, with particular attention to carbon monoxide levels.

Some laboratories will report "CO level less than 10 percent," or no CO level at all. Such generalized statements diminish the potential for coverage under the Act. Fire departments, therefore, should order a toxicological analysis with a specific request that exact toxic levels be listed in the report. If the family approves, an autopsy should also be performed.

Off-Duty Coverage

Fire fighters are also affected by a limitation which requires that death be the result of an act that the fire fighter was obligated or authorized to perform by law, rule, regulation, or condition of employment. This limitation affects the off-duty fire fighter who comes upon a fire or emergency and acts to save life or property. On occasion, off-duty fire fighters take such actions without legal obligation or authority. Thus, they are acting as private citizens and are not covered under the Act.

Paid and volunteer departments can resolve this problem by developing written departmental regulations that specify the obligation and authority of off-duty fire fighters who come upon fires and other emergencies. Such regulations must be consistent with state statutes and local ordinances governing off-duty activities and mutual aid agreements.

Initiating a Claim

A claim can be initiated by calling the Public Safety Officers' Benefits Division of the OJARS at (202) 724-7620. The PSOB staff will supply claim forms and will advise the department of the claim documentation required. Claims may also be initiated by writing to: Public Safety Officers' Benefits Program, U.S. Department of Justice, OJARS, 633

Indiana Avenue, NW, Washington, DC 20531. When writing to report a death, the name and telephone number of the department official responsible for handling the claim must be included.

Claim Payment

Benefits checks are mailed directly to eligible survivors. These may include the fire fighter's spouse and children, and, if there are no spouse and children, the dependent parents. A widow, for example, would receive $50,000. If there were two eligible children, the widow would receive $25,000 and each child would receive $12,500. If the fire fighter were single, his dependent parents would be eligible for the benefit. Generally, parents are considered dependent if they had relied on the deceased fire fighter for over one-third of their support. Other factors are also considered in determining dependency.

The PSOB benefit is not subject to federal tax. Moreover, the benefit is not part of the deceased fire fighter's estate, nor is it subject to attachment by creditors.

The majority of claims are paid within two months of the report of the fire fighter's death. If multiple fire fighter deaths occur, PSOB staff will come to the affected jurisdiction to assist with the required claim documentation. Both eligible beneficiaries and the department will be given technical assistance in completing PSOB forms and in making certain that essential documents are acquired and legally certified. This on-site assistance will substantially accelerate required procedures and speed benefits payment.

Additional information on the program may be obtained by writing to:

Public Safety Officers' Benefits Program
U.S. Department of Justice
OJARS
633 Indiana Avenue, NW
Washington, DC 20531

The Problem of Arson

ESTIMATES OF U.S. FIRES DUE TO INCENDIARY AND SUSPICIOUS FIRES IN STRUCTURES (1978-82)

	Number of Fires				
Types of Fires	1978	1979	1980	1981	1982
Structure Fire of Incendiary Origin	87,000	88,500	92,000	88,000	77,500
Structure Fire of Suspicious Origin	73,000	60,000	54,000	66,500	51,500
Total Structure Fire of Incendiary and Suspicious Origin	160,000	148,500	146,000	154,500	129,000

The estimates are based on data reported to the NFPA by fire departments that responded to the NFPA's Annual Survey of Fire Departments for U.S. Fire Experiences (1978-82).

ESTIMATES OF U.S. CIVILIAN DEATHS DUE TO INCENDIARY AND SUSPICIOUS FIRES IN STRUCTURES (1978-82)

	Civilian Deaths				
Types of Fires	1978	1979	1980	1981	1982
Structure Fire of Incendiary Origin	520	435	590	555	720
Structure Fire of Suspicious Origin	410	240	180	265	190
Total Structure Fire of Incendiary and Suspicious Origin	930	675	770	820	910

The estimates are based on data reported to the NFPA by fire departments that responded to the NFPA's Annual Survey of Fire Departments for U.S. Fire Experiences (1978-82).

A comprehensive listing of films, brochures, slide shows, and other materials that can be used in educating the general public about the arson problem and how to combat it is available from the International Association of Arson Investigators (IAAI). To receive a copy of the list, send a self-addressed, stamped envelope and 25¢ to cover copying costs to: Kurt Ullman, IAAI Public Education Committee, P.O. Box 600, Marlboro, MA 01752.

ESTIMATES OF U.S. PROPERTY LOSS DUE TO INCENDIARY AND SUSPICIOUS FIRES IN STRUCTURES (1978-82)

	Property Loss				
Types of Fires	1978	1979	1980	1981	1982
Structure Fire of Incendiary Origin	$ 650,000,000	$ 787,000,000	$1,158,000,000	$1,142,000,000	$1,088,000,000
Structure Fire of Suspicious Origin	$ 417,000,000	$ 541,000,000	$ 602,000,000	$ 516,000,000	$ 516,000,000
Total Structure Fire of Incendiary and Suspicious Origin	$1,067,000,000	$1,328,000,000	$1,760,000,000	$1,658,000,000	$1,604,000,000

The estimates are based on data reported to the NFPA by fire departments that responded to the NFPA's Annual Survey of Fire Departments for U.S. Fire Experience (1978-82).

Dollar loss figures represent direct property loss only (loss to contents, structure, a vehicle, machinery, vegetation, or anything else involved in a fire), and do not include indirect losses (e.g., business interruption or temporary shelter costs). Dollar loss estimates are based on figures reported by departments for a year, and no adjustments were made for inflation over the five year period.

Arson Law

The need for a new model arson penal law has been the conclusion of many recent studies conducted by public authorities, insurance industry representatives, and research organizations. Without effective laws, neither the fire or police agencies, the prosecutors, nor the insurance industry can hope to curtail or control the high and increasing rate of arson within the United States. While complete uniformity of arson laws among the states is an unrealistic goal, a degree of consistency relative to arson and related offenses is certainly desirable and achievable.

The Alliance of American Insurers, American Insurance Association, National Association of Independent Insurers, and Property Loss Research Bureau undertook the development of a new model arson law; one that would be useful as a guide to legislators and other responsible organizations interested in improving arson provisions within their respective state penal codes. The four cooperating insurance organizations represent a large majority of the property-casualty insurers operating within all 50 states.

Research in this area included a study of the variety of laws enacted, the "Model Arson Law" developed by the Fire Marshals Association of North America (FMANA) in 1934, and the Arson Section of the Model Penal Code structured by the American Law Institute (ALI) in 1960.

Features of Model Arson Penal Law

The model arson penal law combines characteristics of FMANA's model arson law and the theory of ALI's law. This model is structured to apply to the basic varieties of intentional burning, to explosions, and to unknown future offenses not yet experienced in the criminal justice system. It provides reasonable punishment for:

- Acts that endanger both life and property.
- Damage to real and personal property by either fire or explosion.

- Damage to an "occupied" building.
- Conspiracy to cause a fire or explosion.
- Damaging or destroying the property of another person.
- Destruction or damage of property to collect insurance proceeds.
- Reckless or negligent use of fire or explosives.
- Making false reports concerning the placement of incendiary explosives devices or other destructive substances.
- Failure to control or report a dangerous fire.
- Attempting to start a fire or cause an explosion.
- Causing or risking a catastrophe and failure to mitigate a catastrophe.
- Possession of explosives or incendiary devices.

Several states have amended their arson laws in accordance with the Model Arson Penal Code. It is recommended that other states evaluate their criminal codes and consider amendments to their existing statutes so that some uniformity would exist among state arson penal codes.

Model Arson Penal Law

7K 100.1 Arson and Related Offenses

(1) Aggravated Arson. A person is guilty of aggravated arson, a felony of the first degree, if he starts a fire or causes an explosion, or if he aids, counsels or procures a fire or explosion, with the purpose of:
   (a) destroying or damaging an inhabited building or occupied structure of another; or
   (b) causing, either directly or indirectly, death or bodily injury to any other person.

(2) Arson. A person is guilty of arson, a felony of the second degree, if he starts a fire or causes an explosion, or if he aids, counsels or procures the setting of a fire or causing of an explosion with the purpose of:
   (a) destroying or damaging a building or unoccupied structure of another; or
   (b) destroying or damaging any real or any personal property, whether his own or another's, to collect insurance for such loss.

(3) Reckless Burning or Exploding. A person commits a felony of the third degree if he purposely starts a fire or causes an explosion, or if he aids, counsels or procures a fire or explosion, whether on his own property or another's, and thereby recklessly:
   (a) places another person in danger of death or bodily injury; or
   (b) places a building or structure of another, whether occupied or not, in danger of damage or destruction; or
   (c) places any personal property of another having a value of $__________ or more in danger of damage or destruction.

(4) Failure to Control or Report Dangerous Fire. A person who knows that a fire is endangering life or property of another and fails to take reasonable measures to put out or control the fire, when he can do so without substantial risk to himself, or to give a prompt fire alarm, commits a misdemeanor if:
   (a) he knows that he is under an official, contractual or other legal duty to control or combat the fire; or
   (b) the fire was started, albeit lawfully, by him or with his assent, or on property in his custody or control.

(5) Definitions. "Occupied Structure" means any structure, vehicle or place adapted for overnight accommodation of persons, or for carrying on business therein, whether or not a person is actually present.

"Property of Another" means a building or other property, whether real or personal, in which a person other than the offender has an interest which the offender has no authority to defeat or impair, even though the offender may also have an interest in the building or property.

If a building or structure is divided into separately occupied units, any unit not occupied by the offender is an occupied structure of another.

K 100.2 Causing or Risking Catastrophe

(1) Causing Catastrophe. A person who causes a catastrophe by explosion, fire, flood, avalanche, collapse of building, release of poison gas, radioactive material or other harmful or destructive force or substance, or by any other means of causing potentially widespread injury or damage, commits a felony of the second degree if he does so purposely or knowingly, or a felony of the third degree if he does so recklessly.

(2) Risking Catastrophe. A person is guilty of a misdemeanor if he recklessly creates a risk of catastrophe in the employment of fire, explosives or other dangerous means listed in Subsection (1).

(3) Failure to Prevent Catastrophe. A person who knowingly or recklessly fails to take reasonable measures to mitigate a catastrophe commits a misdemeanor if:
   (a) he knows that he is under an official, contractual or other legal duty to take such measures; or
   (b) he did or assented to the act causing or threatening the catastrophe.

K 100.3 Criminal Mischief

(1) Offense Defined. A person is guilty of criminal mischief if he:
   (a) damages or alters any tangible real or personal property of another purposely, recklessly, or by negligence in the employment of fire, explosives, or other dangerous means listed in Section 100.2(1); or
   (b) purposely or recklessly tampers with tangible property of another so as to endanger person(s) or property; or
   (c) purposely or recklessly causes another to suffer pecuniary loss by deception or threat.

(2) Grading. Criminal mischief is a felony of the third degree if the actor purposely causes pecuniary loss in excess of $__________, or a substantial interruption or impairment of public communication, transportation, supply of water, gas or power, or other public service. It is a misdemeanor if the actor purposely causes pecuniary loss in excess of $__________ or a petty misdemeanor if he purposely or recklessly causes pecuniary loss in excess of $__________.

K 100.4 Possession of Explosive or Incendiary Materials or Devices

A person is guilty of a felony of the third degree when he shall possess, manufacture or transport any incendiary or explosive device or material with the intent to use or to provide such device or material to commit any offense described in 100.1(1), (2), and (3).

K 100.5 Attempted Arson

A person is guilty of attempted arson, a felony of the third degree, if he places or distributes any flammable or combustible material, or any gas, radioactive material, or other harmful or destructive material or substance, in an arrangement or preparation with the intent to eventually start a fire or cause an explosion, or to procure the start of a fire or explosion, with the purpose of willfully and maliciously:

(a) destroying or damaging any building or structure of another whether occupied or not; or

(b) destroying or damaging any personal property of another having a value of $__________ or more; or

(c) placing any person in danger of death or bodily harm.

K 100.6 False Reports

A person is guilty of a misdemeanor if he knowingly conveys or causes to be conveyed to any person false information concerning the placement of any incendiary or explosive device or any other destructive substance in any place where persons or property could be endangered.

Arson Reporting-Immunity Legislation

In the opinion of many working in the field of arson reduction, arson reporting-immunity legislation is the keystone to an effective combined effort of the public and private sectors.

One of the problems insurance companies have faced in fighting arson has been the threat of civil suit and potential liability when confidential information about an insured is disclosed to law enforcement authorities. In 1977, the Alliance of American Insurers drafted model legislation entitled, "Arson Reporting-Immunity Bill."

Specifically, the Model Arson Reporting-Immunity Law:

- Allows authorized agencies (defined as state and federal fire marshals, law enforcement officers, insurance commissioners, and prosecuting attorneys) to require that insurance companies release all information concerning a policyholder involved in a fire loss. This information includes history of premium payment and previous claims, as well as investigatory files.
- Requires insurance companies to notify authorized agencies of suspicious fire losses. Such notice constitutes a request for official investigation.
- Grants limited civil and criminal immunity to those insurance companies that provide information under the provisions of this act.
- Provides for the exchange of information between the insurance companies and the authorized agencies, and the exchange of information among authorized agencies.
- Provides for confidentiality of released information.

As of September 1982, 48 states have passed some form of arson reporting-immunity legislation. The laws in twelve of these states reflect all of the important elements of the industry-developed model law. The laws in the other 36 states, however, vary and lack one or more of the sections necessary for effective cooperation. Adoption of all elements of the Model Reporting-Immunity Law is seen as a key element in an effective state program.

The chart which follows provides details on the current status of arson reporting-immunity legislation.

The model legislation on arson reporting-immunity developed by the Alliance of American Insurers is included here so that anti-arson groups can compare this legislation to immunity laws in effect in their jurisdiction.

Arson Reporting Immunity Bill

To enact section ________ of the revised code, providing for certain authorized agencies to request and receive from insurance companies information relating to fire losses; providing for insurance companies to notify authorized agencies of suspicious fire losses such notice to be indicative of a request for an official investigation; providing for immunity to those insurance companies that provide information under the provisions of this act; providing for the exchange of information between the insurance companies and the authorized agencies and the exchange of information between authorized agencies; providing for confidentiality of released information; providing for testimony in matters under litigation and, providing for penalties for violation of the provisions of this act.

Suspected arson caused this residential fire in April 1983 where a couple and their two children perished. Another child and a fire fighter were injured in the fire. (Towanda, PA *Daily Record*)

Section 1. Definitions

(a) This act shall be known as the Arson Reporting-Immunity Statute.

(b) "Authorized Agencies" shall mean:

- (1) The State Fire Marshal when authorized or charged with the investigation of fires at the place where the fire actually took place;
- (2) The Director of the State Department of Law Enforcement or similar State Director;
- (3) The Prosecuting Attorney responsible for prosecution in the county where the fire occurred;
- (4) The District Attorney responsible for prosecution in the county where the fire occurred;
- (5) The State's Attorney responsible for the prosecution in the county where the fire occurred;
- (6) The State Insurance Supervisory Official;
- (7) Local law enforcement agencies, when charged with the responsibility of investigating fires; and solely for the purpose of Section 2(a);
- (8) The Federal Bureau of Investigation or any other Federal agency;
- (9) The United States Attorney's Office when authorized or charged with investigation or prosecution of the fire in question.

(c) "Relevant" means information having any tendency to make the existence of any fact that is of consequence to the investigation or determination of the issue more probable or less probable than it would be without the evidence. (See F.R. Evid Rule 401.)

(d) Material will be "deemed important," if within the sole discretion of the "authorized agency," such material is requested by that "authorized agency."

(e) "Action," as used in this statute, shall include non-action or the failure to take action.

(f) "Immune," as used in Section 2(e) of this act, shall mean that neither a civil action nor a criminal prosecution may arise from any action taken pursuant to Section 2, 3, or 4 of this act where actual malice on the part of the insurance company or authorized agency against the insured is not present.

(g) As used in this Section, "insurance company" includes the ____________ FAIR Plan.

WE WANT TO KNOW . . .

if a name, an address, or a phone number has changed; if there's an upcoming event, a new program or course, a new publication being offered. If you have more current information than is contained in this *Almanac*, know something that should be included in this book, or just have something interesting about the fire protection scene that you want to contribute, please let us know. Write: Editor, *Fire Almanac*, NFPA, Batterymarch Park, Quincy, MA 02269. All suggestions will receive our careful attention.

	CIVIL IMMUNITY	CRIMINAL IMMUNITY	AGENCIES GET INFORMATION WITHOUT SUBPOENA	COMPANIES MUST REPORT	COMPANIES GET INFORMATION. RECIPROCITY	INSURERS NOTIFY ONE AGENCY	REQUIRE AUTHORITIES TESTIFY	AGENCIES SHARE INFORMATION WITH OTHER AGENCIES
	1	2	3	4	5	6	7	8
ALABAMA *pub. officers & emp. 36-19-40 thru 36-19-44*	X	X	X	X	—	X	X	—
ALASKA *Insurance code § 21.89.050*	X	X	X	X	X	X	—	X
ARIZONA *Ins. code §§ 20-1901 thru 20-1907*	X	X	X	X	—	X	X	X
ARKANSAS *§ 66-5601 thru 5605*	X	X	X	X	—	X	—	X
CALIFORNIA *Ins. code §§ 1878 thru 1878.5*	X	—	X	X	X	X	—	X
COLORADO *Ins. code §§ 10-4-1001 thru 10-4-1008*	X *		X	X	—	X	X	X
CONNECTICUT *Ins. code § 38-114h (a)-(g)*	X	X	4 *	X	X	X	X	X
DELAWARE *Chapter 68, Title 16, §§ 6810-6814*	X	X	X	X	X	X	X	X
DISTRICT OF COLUMBIA								
FLORIDA *Ins. code § 633.175 (1)-(7)*	X	X	X	X	--	X	X	X
GEORGIA *Public Safety § 92A-734.1 (a)-(g)*	X	X	X	X	X	X	X	X
HAWAII *Fire Protection § 132-4.5 (a)-(e)*	X	X	4 *	X	X	X	X	—
IDAHO *Chap. 2, Title 41, Sec. 41-270 thru 41-274*	X	X	X	X	X	X	X	X
ILLINOIS *Ins. code 73 § 1153 (a)-(h)*	X	X	4 *	X	3 *	—	X	—
INDIANA *Ins. code §§ 27-2-13-1 thru 27-2-13-4*	X	X	X	X	X	X	—	X
IOWA *St. Fire Marshal chap 100A (1) thru (6)*	X	X	X	X	X	—	X	X
KANSAS *Kansas Stat. Ann 31-401*	X	—	X	X	X	X	X	X
KENTUCKY *Ins. Code 304.22-150 thru 190 & 304.99 - 080*	X	X	4 *	X	X	X	X	X
LOUISIANA *Public Health & Safety 40§ 1568.2*	X	X	X	X	—	X	X	—
MAINE *25 § 2411 thru 2413*	X	X	X	X	X	X	X	X
MARYLAND *article 38.A, §§ 56-57*	X	X	X	X	—	—	—	—
MASSACHUSETTS *chap. 148 Sec. 32*	X	X	X	X	X	X	X	X
MICHIGAN *St. Fire Marshal § 29.4 (1)-(8)*	X	X	X	X	—	X	X	—
MINNESOTA *St. Fire Marshal §§ 299F.052 thru 299F.057*	X	X	X	X	—	X	—	X
MISSISSIPPI *Code An. 1972, Sec 83-13-21 (Supp. 1981)*	X	—	X	—	—	—	—	—
MISSOURI *Ins. Code Chap. 379.176 thru 179*	X	X	X	X	—	X	—	X

This two page chart was developed by the All Industry Research Advisory Council (AIRAC) to aid in tracking the status of arscn reporting - immunity legislation.

Courtesy: Insurance Committee for Arson Control

Section 2. Disclosure of Information

(a) Any authorized agency may, in writing, require the insurance company at interest to release to the requesting agency any or all relevant information or evidence deemed important to the authorized agency which the company may have in its possession, relating to the fire loss in question. Relevant information may include, without limitation herein:

	CIVIL IMMUNITY	CRIMINAL IMMUNITY	AGENCIES GET INFORMATION WITHOUT SUBPOENA	COMPANIES MUST REPORT	COMPANIES GET INFORMATION. RECIPROCITY	INSURERS NOTIFY ONE AGENCY	REQUIRE AUTHORITIES TESTIFY	AGENCIES SHARE INFORMATION WITH OTHER AGENCIES
	1	2	3	4	5	6	7	8
MONTANA *Title 50, ch. 63, Part IV*	X	—	X	X	—	X	X	X
NEBRASKA *81-5, 115 et seq*	X	X	X	X	X	X	X	X
NEVADA								
NEW HAMPSHIRE *Public Safety & Welfare §§ 153:13 thru 153:13a*	X	X	X	X	X	X	X	X
NEW JERSEY *Chap. 17:36-14 thru 21*	X	—	X	X	X	X	X	X
NEW MEXICO *Torts §§ 41-8-1 thru 41-8-6*	X	X	X	X	X	X	—	X
NEW YORK *Ins. Laws § 336 (1) - (6)*	X	X	X	X	3*	X	X	X
NORTH CAROLINA *Fire Pro. § 69-7.1(a) - (e)*	X	X	X	X	—	X	X	—
NORTH DAKOTA *Fires § 18-01-05.1*	X	X	X	2*	X	X	—	—
OHIO *Fire Marshal § 3737-16*	X	X	4*	X	X	X	X	—
OKLAHOMA *Ins. 36 §§ 6301 thru 6306*	X	X	X	X	3*	X	X	X
OREGON *ORS476.090 and 270 and 731.418*	X	X	X	X	—	X	—	—
PENNSYLVANIA *1980 P.L.340 (#85)*	X	X	X	X	X	X	—	X
RHODE ISLAND *Ins..§§ 27-8.1-2 and 27-8.1-3*	X	X	X	X	X	X	X	X
SOUTH CAROLINA								
SOUTH DAKOTA *Ch. 3432A§3432A(1) thru (10)*	X	X	X	X	X	X	X	X
TENNESSEE *Health & Safety § 53-2415 (a) - (g)*	X	X	X	X	X	—	X	X
TEXAS *Ins. Code Art. 5.45 thru 5.46*	X	X	X	—	—	—	X	—
UTAH *St. Affairs in Genl § 63-29-24*	X	X	X	X	—	X	—	—
VERMONT *8 V.S.A., chap. 101 subchapter 12A, §3671 thru 3673*	X	—	X	X	—	X	—	—
VIRGINIA *Fire Protection § 27-85.3 et seq*	X	X	X	X	X	X	—	X
WASHINGTON *Insurance § 48.80.1 et seq*	X	X	X	X	X	X	X	X
WEST VIRGINIA *Misc B. & O. § 29-3-11 thru 29-3-12a*	X*		X	X	—	X	X	—
WISCONSIN *Police Reg. § 165.55 (14)*	X	X	X	2*	X	—	—	—
WYOMING *stat 6-7-111 thru 6-7-113*	X	X	X	X	X	X	—	X
PUERTO RICO								

* grants limited immunity, but does not use the terms criminal or civil
2* does not require insurance companies to report suspicious claims but states that the y"may report"
3* provides that insurance companies may ask agencies for information but does not specifically state that release of the information by the agencies is mandatory.
4* When investigating cases of "potential" arson, agencies may request information from insurers

(1) Pertinent insurance policy information relevant to a fire loss under investigation and any application for such a policy;
(2) Policy premium payment records which are available;
(3) History of previous claims made by the insured;
(4) Material relating to the investigation of the loss, including statements of any person, proof of loss, and any other evidence relevant to the investigation.

(b)

(1) When an insurance company has reason to believe that a fire loss in which it has an interest may be of other than accidental cause, then, for the purpose of notification and for having such fire loss investigated, the company shall, in writing, notify an authorized agency and provide it with any or all material developed from the company's inquiry into the fire loss.

(2) When an insurance company provides any one of the authorized agencies with notice of a fire loss, it shall be sufficient notice for the purpose of this act.

(3) Nothing in Section 2(b) of this act shall abrogate or impair the rights or powers created under Section 2(a) of this act.

(c) The authorized agency provided with information pursuant to Section 2(a) or 2(b) of this act and in furtherance of its own purposes, may release or provide such information to any of the other authorized agencies.

(d) Any insurance company providing information to an authorized agency or agencies pursuant to Section 2(a) or 2(b) of this act shall have the right to request relevant information and receive, within a reasonable time, not to exceed 30 days, the information requested.

(e) Any insurance company, or person acting in its behalf; or authorized agency who releases information, whether oral or written, pursuant to Section 2 of this act shall be immune from any liability arising out of a civil action, or, penalty resulting from a criminal prosecution.

Section 3. Evidence.

(a) Any authorized agency and insurance company described in Section 1 or 2 of this act that receives any information furnished pursuant to this act, shall hold the information in confidence and not release the information except to another authorized agency, until such time as its release is required pursuant to a criminal or civil proceeding.

(b) Any authorized agency referred to in Section 1 of this act, or their personnel, may be required to testify in any litigation in which the insurance company at interest is named as a party.

[NOTE: Sections 4(a), (b) and (c) are optional and not required.]

Section 4. Enforcement.

(a) No person or agency shall intentionally or knowingly refuse to release any information requested pursuant to Section 2(a) or 2(c) of this act.

(b) No person shall intentionally or knowingly refuse to provide authorized agencies relevant information pursuant to Section 2(b) of this act.

(c) No person shall fail to hold in confidence information required to be held in confidence by Section 3 of this act.

(d) Whoever violates Section 4(a), 4(b), or 4(c) of this act is guilty of a ____________ misdemeanor, and upon conviction, shall be punished by a fine not to exceed $____________.

Section 5. Home Rule and Common Law.

(a) The provisions of this act shall not be construed to affect or repeal any ordinance of any municipality relating to fire prevention or the control of arson, but the jurisdiction of the State Fire Marshal and the Director of the State Department of Law Enforcement (or other similar State Police Director) in such municipality is to be concurrent with that of the municipal and county authorities.

(b) With the exception of Section 1(f), all other provisions of this act shall not be construed to impair any existing statutory or common law rights or powers.

Emergency Medical Service

Emergency Medical Services and Technicians (EMS and EMTs)

During the last two decades, the terms EMS and EMT have become commonly used acronyms in the fire service. Television medical programs have done much to advance our awareness of these terms, their meanings, and importance. Emergency Medical Service (EMS) and Emergency Medical Technician (EMT) generally refer, respectively, to the organization and individual rendering first aid and emergency medical care to sick and injured people before and during transport to a hospital.

Relationship to Fire Service

Historically, the fire service — including volunteer rescue/ambulance squads — has been one of the primary providers of emergency medical care in the United States. The number of fire departments providing this service has increased dramatically in recent years and is still growing.

Beginning in the late 1960s, when the federal government became seriously involved in local pre-hospital emergency care and transportation programs, national standards for emergency medical services improved. Passage of the EMS Systems Act of 1973 (Public Law 93-154), gave substance to government efforts so that by 1980, an estimated 300,000 fire fighters had earned EMT certification.

Standards for pre-hospital care have always been set by the medical community, which helps fire departments keep abreast of significant improvements in emergency procedures. Such developments in recent years have included cardiopulmonary resuscitation, new devices and techniques for management of spinal cord injury, pneumatic counterpressure devices for dealing with shock, improved airway maintenance equipment, mechanical CPR adjuncts, and designated trauma centers.

In the comprehensive book *Emergency Medical Services**, EMS expert James O. Page describes four "profiles" of a fire department's EMS operation or component which he has developed on the basis of national experience. These four basic profiles, with a listing of significant features of each, are:

Basic Life Support Service

1. At least one fire fighter or officer assigned to each fire company trained and certified as an Emergency Medical Technician. Preferable if all personnel are trained and certified to EMT level (basic level).
2. Standard departmental dispatch procedures call for dispatch of nearest fire company to scene of medical emergency in all cases unless there is an ambulance or Mobile Intensive Care Unit closer to the scene. In cases of certain medical malfunctions (cardiac arrest, psychiatric emergency, severe trauma, person trapped, multiple injuries), both engine company and ambulance (or Mobile Intensive Care Unit) are dispatched simultaneously.
3. Fire company personnel perform basic life support services until arrival of ambulance or Mobile Intensive Care Unit. Where necessary, fire company remains at scene to assist ambulance or paramedic personnel.

4. Departmental priorities place a higher regard for life-threatening medical emergencies than for property-damage fires. Fire companies which are committed to a medical emergency are not dispatched to property-damage fires until the medical emergency is resolved and the company is made available by the company officer.
5. Departmental dispatching procedures call for "move-ups" or other company coverage arrangements to provide adequate fire protection where fire companies are out-of-service for significant periods of time in connection with medical emergencies.
6. Basic life support service is likely to be most effective if large numbers of citizens are trained in CPR (cardiopulmonary resuscitation).

Advanced Life Support (Paramedic) Service (Pre-hospital Definitive Care and Stabilization)

1. Service may be designed and equipped for transporting (ambulance) function or for mobile intensive care service without transportation responsibility.
2. Although a few systems use civilian employees of the fire department as Mobile Intensive Care Unit "paramedics," most utilize fire fighters trained to this advanced level.
3. Advanced Life Support will be most effective in cases of life-threatening medical emergencies where it is part of a system which also includes basic life support service (including a citizen CPR training program).
4. In profiles where the Mobile Intensive Care Unit is non-transporting, and the ambulance service does not include the mobile intensive care service, there will be a need for M.I.C.U. follow-up to hospitals (with at least one of the paramedic fire fighters accompanying the patient in the ambulance) in certain cases.
5. Even where a fire department provides personnel for an advanced life support system, the system must be recognized as a hospital-oriented component and the personnel must function with close ties to their resource hospital.

Emergency Ambulance Service

1. Depending on local and state law, personnel may be either ambulance attendants (Red Cross First Aid and Emergency Care trained) or Emergency Medical Technicians (trained in an approved EMT training program consisting of at least 71 hours of classroom instruction and 10 hours of clinical experience).
2. Through public education and field evaluation, there is an attempt to restrict service to true emergencies. Non-emergency ambulance service (such as convalescent transports) is referred to either private ambulance services or another public service.
3. Although a few systems use civilian employees of the fire department as EMTs (or attendant-drivers), most use fire fighters who are either specifically and permanently assigned to emergency ambulance duty, or who rotate or take turns at such duty.

Emergency and Non-Emergency Ambulance Service

Note: The significant features are basically the same as with Emergency Ambulance Service except that no effort is made to distinguish between the emergency and non-emergency case (unless there is an effort to determine the need for urgency in cases of true emergency). A decision to provide non-emergency ambulance service should be made with the understanding that the service probably will be subject to public abuse, and that vehicular and personnel requirements may be doubled or tripled over the requirements for strictly emergency ambulance service.

**Emergency Medical Services* by James O. Page. Second Edition, 1978. Published by the National Fire Protection Association, Quincy, MA. Mr. Page is a Batt. Chief (Retired), Los Angeles County Fire Department, and Executive Director of the ACT Foundation, Basking Ridge, NJ.

EMT Training Courses

EMTs must learn basic life support skills through a well-conducted course supplemented by supervised experience and testing. The trend is toward providing advanced-level pre-hospital care, usually called paramedic service. Other necessary components of a good EMS system include training of dispatch personnel, coordination with hospital emergency room personnel, and cooperation with the general medical community.

In the late 1970s, a 56-hour videotape program and workbook were developed as an EMT training package by the International Association of Fire Chiefs and the International Association of Fire Fighters. This package was part of apprenticeship programs for the one-year EMT-A (for ambulance) certification and the two-year certification as an EMT-P (paramedic). More recently, additional EMT ratings have been developed on a state-by-state basis. Generally, depending on various state regulations, there are now these four levels: the basic level, EMT-A (ambulance); EMT-I (intermediate); EMT-C (cardiac); and EMT-P (paramedic, the highest level). Both programs emphasize the need for on-the-job experience and supervision as well as continuing education in emergency medicine.

Basic courses and standards for EMTs have been approved by the U.S. Department of Transportation's (DOT) National Highway Transportation Safety Administration. The following is a summary of the National Training Course, "Emergency Medical Services — Paramedic," developed by DOT.

Course Description

This training course is organized to provide the student with knowledge about the acute, critical differences in physiology, pathophysiology, or clinical symptoms, as they pertain to the prehospital emergency medical care, of the infant, child, adolescent, adult, and geriatric patient. Students must have an opportunity to acquire clinical experience and practice skills related to the emergency medical care of these patients.

The course consists of three components: didactic, clinical (in-hospital), and field internship. The time required to complete each component will depend on the ability of each student to successfully demonstrate completion of stated objectives through an examination of knowledge and skills.

The course is designed to support the following instructional design:

- Didactic: Lectures, discussions and demonstrations presented by physicians and others competent in the field.
- Clinical: Instruction and supervised practice of emergency medical skills in critical care units, emergency departments, obstetric units and operating rooms (including anesthesia), and psychological crisis intervention centers.
- Field Internship—Critical Evaluation of On-The-Job Performance: Experience as an extra person in a student capacity on an intensive care vehicle (ambulance). This unit shall have telecommunication with medical command authority and equipment and drugs necessary for advanced life support. The student must be supervised by a physician or nurse qualified in emergency medicine or a state or nationally certified EMT-Paramedic. This applied practice component of the education should also occur within an emergency medical care system that delivers paramedic care under medical direction, has biomedical telecommunications, all necessary drugs and equipment, an adequate evaluation system to insure quality in care provided, and a well-defined program of continuing education for its personnel.

Facts and Figures

Early in 1982, it was estimated that there were slightly more than 300 EMS regions throughout the U.S., nearly all of which had received some federal financial assistance. A survey in October 1981 of all state health departments by the *Journal of Emergency Medical Services* (*JEMS*) revealed that there are 485,000 licensed EMTs (basic, intermediate, and advanced). (An earlier study by *JEMS* estimated that in 1980 the number of patients treated and/or transported by EMS personnel totaled 11,637,000.)

In 1981, *JEMS* undertook a limited survey of salaries of career EMS personnel and published the results in the January 1982 issue. Some of the findings are listed below. As *JEMS* points out, this survey does not cover "compensation other than the paycheck," such as paid vacations, holidays, health benefits, life insurance, paid sick days, overtime, etc.

EMT starting salaries (Sample size 125) high $32,800; low $8,000; mean $20,000; average $12,604.

EMT maximum salaries (Sample size 111) high $44,900; low $9,540; mean $27,220; average $16,394.

Average time for EMTs to reach their maximum salaries (sample size 89) shortest time 5 years; longest time 27 years; mean 13.75 years; average 4.4 years.

EMT-P starting salaries (Sample size 107) high $24,700; low $8,000; mean $16,350; average $16,407.

EMT-P maximum salaries (Sample size 108) high $37,900; low $8,000; mean $22,950; average $19,396.

Average time for EMT-Ps to reach maximum salaries (Sample size 85) longest time 27 years; shortest time 5 years; mean 13.75 years; average 5.06 years.

Supervisor starting salaries (Sample size 105) high $44,900; low $8,000; mean $26,450; average $18,943.

Supervisor maximum salaries (Sample size 90) high $59,900, low $13,000; mean $36,450; average $24,826.

Average time for supervisors to reach maximum salaries (Sample size 65) longest time 27 years; shortest time 1 year; mean 14 years; average 5.19 years.

New approaches to emergency medical services are being constantly developed in this rapidly changing field. One new concept is the "public utility model" under which EMS activities are carried out by an organization modeled on a privately owned public utility set-up. Other new approaches are bound to emerge as the field grows and experience broadens.

LEGISLATION AFFECTING EMS

Federal legislation governing the delivery of Emergency Medical Services (EMS) is titled "Emergency Medical Systems Act of 1973" (Public Law 93-154), passed by Congress November 16, 1973. An amendment to Title XII of the Public Health Service Act, this legislation was enacted "to provide assistance and encouragement for the development of comprehensive area emergency medical services systems," as the opening paragraph of the Act stated.

In 1976, Congress passed H.R. 12664 to revise and extend provisions of the original legislation. Specific funding for EMS ceased with the passage of the Omnibus Act of 1981. Instead, Congress included EMS support in a block grant to the states. As a result, the EMS community must convince state and local governments of the importance of EMS as an essential and integral part of the health services delivery system.

Through the National Highway, Traffic and Safety Administration, there are some funds for purchase of ambulances for EMS use. There is also some money for preventive work available through the National Center for Disease Control.

Up to now, lack of funding under the EMS Act does not appear to have had an impact on EMS activities. When the Act was in effect, funding averaged 14 cents per capita; the latest study by the ACT Foundation puts the amount at 24 cents per capita.

EMS Program Profiles

The following list of EMS programs contains names and addresses of people who may be contacted for information about planning, implementing, designing, re-designing, and/or evaluating fire service EMS programs.

These names and addresses are organized by profile, and within each profile there are many variations. Services classified as operating in nontransporting profiles may either use transporting or nontransporting vehicles. Profile determinations were made according to whether transportation is routinely provided or not. Listing a profile as using engine or truck companies as first response does not mean that all calls have such a response.

These profiles were compiled using answers to an Advanced Coronary Treatment (ACT) Foundation survey. The survey was verified by letter from each state EMS director. The survey was published by the Federal Emergency Management Agency (FEMA) in its Fire Service Program Management Guide (1980).

The following definitions are helpful in understanding the profiles.

First Responder:

(1) Level of training:

- D.O.T. course entitled "First Responder" or
- Crash Injury Management, or
- Red Cross Advanced First Aid and Emergency Care and CPR, or
- Some equivalent.

(2) Response role:

- First unit dispatched and/or at the scene. Can be any level of training.

EMT: Basic Life Support emergency care not involving invasive techniques.

Paramedic: Advanced life support emergency care using invasive techniques and other medical techniques under direction of a doctor. For purposes of this survey, it includes intermediate training levels and presupposes certification as an EMT before becoming a paramedic.

Career: Full-time, paid personnel.

Volunteer: Either non-paid personnel or on-call personnel (paid by call).

Civilian: Non-suppression EMS personnel within the fire department. May include sworn members of the fire department—neither trained nor serving as fire fighters.

Dual-Role, Cross-Trained: Fully qualified fire fighters serving in an EMS role after completion of a period of service as fire fighters. Responding both to fires and EMS calls.

Profile 1:

1. Dual-role, cross-trained
2. Career fire fighters serving as
3. EMTs on
4. Nontransporting vehicles
5. With engine or truck company first response.

Battalion Chief Gerald A. Rainsbarger
Riverside City Fire Dept.
3900 Main St.
Riverside, CA 92522
714-787-7328
Pop.: 167,600
72.8 sq. mi.

Assistant Chief Roger Phillips
San Diego Fire Dept.
4206 Chamoune Ave.
San Diego, CA 921045
619-236-6475

Chief Harold Lamphere, Jr.
Norwich Fire Dept.
24 Chestnut St.
Norwich, CT 06360
203-889-2611 (occasional transport)
Pop.: 44,000
29.23 sq. mi.

Chief Gary L. Nichols
Sedgwick County Fire Dept.
4343 N. Woodlawn
Wichita, KS 67220
315-744-0471
Pop.: 65,000
630 sq. mi.

Chief L. Bellamy
Bowling Green Fire Dept.
325 E. 10th Street, Fire Headquarters
Bowling Green, KY 42101
502-843-8921
Pop.: 45,000
28 sq. mi.

Robert N. Mood, EMS Coordinator
Quincy Fire Dept.
40 Quincy Ave.
Quincy, MA 02169
617-471-7309 (occasional transport)
Pop.: 97,000
16.77 sq. mi.

Deputy Chief E. Ring
Minneapolis Fire Dept.
Room 230, City Hall
Minneapolis, MN 55415
612-348-2626
Pop.: 380,000
59 sq. mi.

B. K. Walsh, Training Officer
Missoula Fire Dept.
200 W. Pine St.
Missoula, MT 5980l
406-721-2291
Pop.: 40,000
14 sq. mi.

Roger Chapp, Chief of Training
Lincoln Fire Dept.
1801 Q St.
Lincoln, NE 68508
402-474-6181
Pop.: 180,000
55 sq. mi.

Deputy Chief Charles Swody
Elizabeth Fire Dept.
316 Irvington Ave.
Elizabeth, NJ 07208
201-352-9600 (occasional transport)
Pop.: 112,000
11.7 sq. mi.

Chief Frank Stefanelli
Jamestown Fire Dept.
Municipal Building
Jamestown, NY 14701

Captain James E. Farrell
North Tonawanda Fire Dept.
495 Zimmerman St.
North Tonawanda, NY 14120
716-693-2341
Pop.: 40,000
10 sq. mi.

Chief Richard S. Smith
Yonkers Fire Dept.
7 New School St.
Yonkers, NY 10701
914-963-1537
Pop.: 204,000
21 sq. mi.

District Chief Robert J. Ellison
Charlotte Fire Dept.
125 S. Davidson St.
Charlotte, NC 28202
704-374-2881
Pop.: 333,000
137.9 sq. mi.

Harold D. Jones, EMS Manager
Raleigh Fire Department
220 S. Dawson St.
Raleigh, NC 27601
919-755-6395
Raleigh Fire Department
220 S. Dawson St.
Raleigh, NC 27601
919-755-6395
Pop.: 150,000
45 sq. mi.

Everett Brewer
Enid Fire Dept.
215 S. Independence
Enid, OK 73701
405-234-0400 ext. 265
Pop.: 60,000
80 sq. mi.

Battalion Chief Wilbur Strait
Ashland Fire Dept.
455 Siskiyou Blvd.
Ashland, OR 97520
503-482-1393 (capable of transport)
Pop.: 16,000
75 sq. mi.

Pat Masur, EMS Coordinator
Sioux Falls Fire Dept.
100 S. Minnesota
Sioux Falls, SD 57102
605-339-7173
Pop.: 80,000
45 sq. mi.

Profile 2:

1. Dual-role, cross-trained
2. Career fire fighters serving as
3. Paramedics on
4. Nontransporting vehicles
5. With engine or truck company first response.

Captain Donald A. Wear
Birmingham Fire and Rescue Service Dept.
1807 7th Ave., N.
Birmingham, AL 35203
205-323-8304
Pop.: 265,000
100 sq. mi.

Lieutenant F. D. Sims
Mobile Fire Dept.
701 St. Francis St.
Mobile, AL 36602
205-438-7351
Pop.: 200,000
142 sq. mi.

Captain Robert G. Ward
Lake Havasu City Fire Dept.
145 N. Lake Havasu Ave.
Lake Havasu City, AZ 86403
602-855-1141
Pop.: 17,000
40 sq. mi.

Division Chief O. W. Powell
Phoenix Fire Dept.
1130 N. 1st St.
Phoenix, AZ 85004
602-262-6977
Pop.: 800,000
235 sq. mi.

Captain S. L. Guyer
Hawthorne Fire Dept.
4475 W. El Segundo Blvd.
Hawthorne, CA 90250
213-970-7967
Pop.: 56,000
5.5 sq. mi.

Captain James P. Schwieder
Aurora Fire Dept.
1470 S. Havana St.
Aurora, CO 80012
303-750-5000 ext. 460
Pop.: 168,000
60 sq. mi.

Thomas C. Eisehut, EMS Coordinator
Daytona Beach Fire Dept.
P.O. Box 906
Daytona Beach, FL 32015
904-258-3184
Pop.: 51,000 (500,000 seasonal)
26 sq. mi.

Assistant Chief M. K. Kelly
Orlando Fire Dept.
P.O. Box 2846
Orlando, FL 32802
305-849-2135 (capable of transport)
Pop.: 120,000
44 sq. mi.

District Chief J. D. Colson
Montgomery Fire Dept.
Rescue Service
P.O. Box 1111
City Hall
Montgomery, AL 36104

Lieutenant J. Steven Howard
Kalamazoo Fire Dept.
116 W. Cedar St.
Kalamazoo, MI 49007
616-385-8182
Pop.: 85,555
24.95 sq. mi.

Sergeant Edwin DeLoney
Southfield Fire Dept.
24477 Lahser Rd.
Southfield, MI 48034
313-354-4403
Pop.: 90,000
28.6 sq. mi.

Lieutenant Joseph Fahd
Albany Fire Dept.
Public Safety Building
Albany, NY 12202
518-463-1234
Pop.: 123,000
26.1 sq. mi.

Captain Thomas Toohey, Jr.
Schenectady Fire Dept.
155 Erie Blvd.
Schenectady, NY 12305
518-382-5141
Pop.: 75,000
10.4 sq. mi.

Deputy Chief Thomas R. Haugstad
Everett Fire Dept.
2801 Dakes
Everett, WA 98201
206-259-8840
Pop.: 55,000
39 sq. mi.

Profile 3:

1. Dual-role, cross-trained
2. Career fire fighters serving as
3. First responders.

Captain Phillip Bode
Cedar Rapids Fire Dept.
427 - 1st St. SE
Cedar Rapids, IA 52401
319-398-5342
Pop.: 118,000
52 sq. mi.

Chief Robert P. Keating
Office of the Fire Chief
Civic Center
410 E. Washington St.
Iowa City, IA 52240
319-354-1800
Pop.: 50,000
25 sq. mi.

Chief P. N. Ball
Asheville Fire Dept.
P.O. Box 7148
Asheville, NC 28807
704-255-5334
Pop.: 63,000
30 sq. mi.

Chief Richard Baron
Rutland Fire Dept.
Rutland, VT 05701
802-773-2193
Pop.: 35,000
100 sq. mi.

Assistant Chief Rich Stone
Training Officer
Cheyenne Fire Dept.
Suite 307
2101 O'Neil Ave.
Cheyenne, WY 82001
307-637-6313
Pop.: 50,000
24 sq. mi.

Profile 4:

1. Dual-role, cross-trained
2. Career fire fighters serving as
3. EMTs on
4. Transporting ambulance vehicles
5. With engine or truck company first response.

Lieutenant Jack Rosano, EMS Director
Berkeley Fire Dept.
2121 McKinley Ave.
Berkeley, CA 94703
415-644-6153
Pop.: 120,000
10 sq. mi.

Captain L. Taggart
La Grange Fire Dept.
300 W. Burlington Ave.
La Grange, IL 60525
312-479-2338
Pop.: 18,500
2.5 sq. mi.

Chief Gary L. Thomas
Clinton Fire Dept.
Central Fire Station
334 - 3rd Ave., S.
Clinton, IA 52732
319-242-0125
Pop.: 35,000
33 sq. mi.

Jon W. Campbell
Jackson Fire Dept.
555 Southwest St.
Jackson, MS 39205
601-960-2013
Pop.: 400,000
102 sq. mi.

Deputy Chief Robert E. Wallingford
Laconia Fire Dept.
848 N. Main St.
Laconia, NH 03246
603-524-6881
Pop.: 17,000
27 sq. mi.

Deputy Chief Herve Provencher
Manchester Fire Dept.
100 Merrimack St.
Manchester, NH 03103
603-669-2256
Pop.: 95,000
34 sq. mi.

Assistant Chief H. L. Sandlin
Wilmington Fire Dept.
P.O. Box 1810
Wilmington, NC 28401
919-762-4460
Pop.: 50,000
21 sq. mi.

Chief Paul Andrews
Ponca City Fire Dept.
P.O. Box 1450
Ponca City, OK 74601
405-765-4131
Pop.: 56,000
1,100 sq. mi.

Assistant Chief Steve Hacku
Fire Dept.
75 Masonic Ave.
Wallingford, CT 06492
203-269-0276
Pop.: 49,000
42 sq. mi.

Chief Ken Mikesell
City of Eau Claire Fire Dept.
216 S. Dewey St.
Eau Claire, WI 54701
715-839-5012
Pop.: 50,000
26 sq. mi.

Profile 5:

1. Dual-role, cross-trained
2. Career fire fighters serving as
3. Paramedics on
4. Transporting ambulance vehicles
5. With engine or truck company first response.

David Rockney, Paramedic Coordinator
Fairbanks Fire Dept.
EMS Division
656 - 7th Ave.
Fairbanks, AK 99701
907-452-1527
Pop.: 32,000
11 sq. mi.

Assistant Chief Harold Perryman
Springdale Fire Dept.
417 S. Holcomb
Springdale, AR 72764
501-751-4510
Pop.: 32,000
20 sq. mi.

Battalion Chief William Woodcock
Paramedic Coordinator
El Segundo Fire Dept.
314 Main St.
El Segundo, CA 90245
213-322-4311
Pop.: 15,000 (100,000 daily work force)
5.5 sq. mi.

Battalion Chief Robert R. Wall
Palo Alto Fire Dept.
250 Hamilton Ave.
Palo Alto, CA 94301
415-329-2324
Pop.: 125,000
37.5 sq. mi.

M. M. Hendrix, DFAC of Rescue
Jacksonville Fire Division
107 Market St.
Jacksonville, FL 32202
904-633-5425
Pop.: 585,000
823 sq. mi.

Chief Larry A. Kilburn
City of Miami, Fire - Rescue
2301 NW 23rd St.
Miami, FL 33142
305-579-6241
Pop.: 350,000
34 sq. mi.

Chief H. R. Stinchcomb
City of Sarasota Fire Dept.
1445 - 4th St.
Sarasota, FL 33577
813-365-1616
Pop.: 52,000 (80,000 seasonal)
17 sq. mi.

Tony Licata, Rescue Chief
Tampa Fire Dept.
808 E. Zack St.
Tampa, FL 33602
813-223-8296
Pop.: 350,000
84 sq. mi.

Deputy Chief James Quinn
Deerfield - Bannockburn Fire Dept.
839 Deerfield Rd.
Deerfield, IL 60015
312-945-4066
Pop.: 25,000
8.33 sq. mi.

Lieutenant B. Goss
Ambulance Services Officer
Elk Grove Village Fire Dept.
101 Biersterfield
Elk Grove Village, IL 60007
312-439-3900
Pop.: 25,000
14 sq. mi.

Captain Peter Andersen
Highland Park Fire Dept.
1677 Old Deerfield Rd.
Highland Park, IL 60035
312-433-3111
Pop.: 35,000
12.5 sq. mi.

Lieutenant Rick Payne
Palatine Fire Dept.
39 E. Colfax
Palatine, IL 60067
312-359-0098
Pop.: 50,000
36 sq. mi.

Chief R. N. Dunphy
Dubuque Fire Dept.
Fire Dept. Headquarters
9th and Central Aves.
Dubuque, IA 52001
319-556-1155
Pop.: 65,000
23.9 sq. mi.

Chief Earl England
Grandview Fire Dept.
1200 Main St.
Grandview, MO 64030
816-763-3900 ext. 60
Pop.: 25,000+
15.5 sq. mi.

Assistant Chief R. J. Warsocki
Omaha Fire Division
1516 Jackson St.
Omaha, NE 68102
402-444-5746
Pop.: 365,000
82.5 sq. mi.

Captain Rodger C. Crauder
Paramedic Commander
Cincinnati Fire Division
430 Central Ave.
Cincinnati, OH 45202
513-241-6700 ext. 54
Pop.: 450,000
70+ sq. mi.

Battalion Chief H. J. Dutko
Columbus Division of Fire
200 Greenlawn Ave.
Columbus, OH 43223
614-222-7384
Pop.: 670,000
179 sq. mi.

Lieutenant Laird Blanchard
Washington County Fire District #1
17880 SW Blamton St.
Aloha, OR 97007
503-649-8577
Pop.: 150,000
80 sq. mi.

Captain James R. Oldham, Sr.
Springfield Fire Division
350 N. Fountain Ave.
Springfield, OH 45504
513-324-7618
Pop.: 75,000
25 sq. mi.

Chief Ronald S. Jones
Cranston Fire Dept. Headquarters
301 Pontiac Ave.
Cranston, RI 02910
401-461-4161
Pop.: 72,000
28.2 sq. mi.

Peter Jones, EMS Coordinator
North Kingstown Fire Dept.
8150 Post Rd.
North Kingstown, RI 02852
401-294-3344
Pop.: 29,000
53.7 sq. mi.

Battalion Chief Robert N. Drummond
Providence Fire Dept.
Emergency Medical Division
209 Fountain St.
Providence, RI 02903
401-351-0505
Pop.: 160,000
18 sq. mi.

Deputy Chief Bobby C. Moore
Dallas Fire Dept.
Emergency Medical Services Division
2014 Main St., Room 211
Dallas, TX 75201
214-670-4311
Pop.: 914,000
378 sq. mi.

Chief Kenneth D. Hancock
Weber County Fire Dept.
1871 N. 1350 W
Harrisville, UT 84404
801-399-8523

Captain James Trollinger
Arlington County Fire Dept.
Emergency Medical Rescue Services
Bureau
1020 N. Hudson St.
Arlington, VA 22201
703-558-2485
Pop.: 180,000
25. sq. mi.

Battalion Chief W. Weber
Janesville Fire Dept.
303 Milton Ave.
Janesville, WI 53545
608-752-2601
Pop.: 51,500+
70.1 sq. mi.

Charles Dirienzo, Chief of Paramedics
Madison Fire Dept.
325 W. Johnson St.
Madison, WI 53703
608-266-4420
Pop.: 173,000
54.9 sq. mi.

Frank Oulman
Beavertown Fire Dept.
4950 SW Hall Blvd.
Beavertown, OR 97005
503-643-7414
Pop.: 31,000
9 sq. mi.

Deputy Chief Kenneth H. Klontz
Akron Fire Dept., EMS
57 S. Broadway
Akron, OH 44308
216-275-2071
Pop.: 250,000
58 sq. mi.

Phyllis A. Riddle, RN
Emergency Medical Supervisor
Dayton Fire Dept.
300 N. Main St.
Dayton, OH 45402
513-225-5344
Pop.: 198,000
49 sq. mi.

Profile 6:

1. Dual-role, cross-trained
2. Career fire fighters serving as
3. EMTs on
4. Nontransporting vehicles
5. Without engine or truck company first response.

Battalion Chief Everett A. Hixenbaugh
Freemont Fire Dept.
4200 Mowry Ave.
Freemont, CA 94538
415-791-4292
Pop.: 135,000
96 sq. mi.

Adam Piskura, Drillmaster
Danbury Fire Dept.
19 New St.
Danbury, CT 06810
203-748-2633
Pop.: 65,000
42 sq. mi.

Captain Robert L. Zickler
Emergency Medical Services
Indianapolis Fire Dept.
555 N. Jersey St.
Indianapolis, IN 46204
317-633-6041
Pop.: 750,000
92.2 sq. mi.

Captain J. L. Cloud
Wichita Fire Dept.
455 N. Main
Wichita, KS 67202
316-268-4579
Pop.: 280,000
91 sq. mi.

Chief Ricky Davidson
Shreveport Fire Dept.
801 Crockett St.
Shreveport, LA 71101
318-226-6214
Pop.: 217,651
98 sq. mi.

George L. Herrington, Training Officer
Hattiesburg Fire Dept.
810 N. Main St.
Hattiesburg, MS 39401
601-544-5371
Pop.: 42,000
17.5 sq. mi.

Chief Robert L. Harrell
Clinton Fire Dept.
Washington and Grandriver
Clinton, MO 64735
816-885-8171
Pop.: 9,200
14 sq. mi.

Assistant Chief Harry L. Hull
Dept. of Public Safety
Room 402, City Hall
St. Louis, MO 63103
314-622-3223
Pop.: 500,000
61.37 sq. mi.

Assistant Chief Mike Holton
Carson City Fire Dept.
111 N. Curry St.
Carson City, NV 89701
702-882-1663
Pop.: 35,000
144 sq. mi.

Chief Ron Miller
Stillwater Fire Dept.
1506 S. Main St.
Stillwater, OK 74074
405-372-0497
Pop.: 40,000
500 sq. mi. (21 in city)

Marvin L. Manning, Training Officer
Eugene Fire Dept.
777 Pearl St.
Eugene, OR 97401
503-687-5411
Pop.: 130,000
35 sq. mi.

Deputy Chief James Breon
Erie Fire Dept.
311 Marsh St.
Erie, PA 16508
814-456-8561 ext. 250 or 252
Pop.: 126,000
22 sq. mi.

Brent Gibson
Ogden City Fire Dept.
320 - 26th St.
Ogden, UT 84401
801-399-8317
Pop.: 65,000
25 sq. mi.

Chief Otto Jensen
Vancouver Fire Dept.
900 W. Evergreen
Vancouver, WA 98660
206-696-8166
Pop.: 48,600
13.5 sq. mi.

Chief Robert Cole
Mt. Pleasant Fire Dept.
6200 Durrand Ave.
Racine, WI 53406
414-554-8812
Pop.: 20,000
36 sq. mi.

Chief Edward C. Carroll
City of Yakima Fire Dept.
401 N. Front St.
Yakima, WA 98901
509-575-6060
Pop.: 52,250
14 sq. mi.

Profile 7:

1. Dual-role, cross-trained
2. Career fire fighters serving as
3. Paramedics on
4. Nontransporting vehicles
5. Without engine or truck company first response.

Battalion Chief Arnold R. Weuve
Tucson Fire Dept.
P.O. Box 27210
Tucson, AZ 85726
602-791-4806 (occasional transport)
Pop.: 330,000
99 sq. mi.

Assistant Chief Harold Owens
New Haven Fire Dept.
952 Grand Ave.
New Haven, CT 06510
203-787-6219 (capable of transport)
Pop.: 127,500
18.7 sq. mi.

Assistant Chief Larry Ladd
Indian Rocks Special Fire Control District
304 First St.
Indian Rocks Beach, FL 33535
813-595-1117
Pop.: 15,000 (55,000 seasonal)
15 sq. mi.

Deputy Chief Paul J. Goodart
Largo Fire Dept.
205 Cleveland Ave., SW
Largo, FL 33540
813-581-6400
Pop.: 65,000
23 sq. mi.

Deputy Chief F. D. Heard
Atlanta Fire Bureau
46 Courtland St., SE
Atlanta, GA 30303
404-658-6901
Pop.: 450,000
132 sq. mi.

Captain Rex Shelburne
Las Vegas Fire Dept.
400 E. Stewart Ave.
Las Vegas, NV 89101
702-386-6376 (capable of transport)
Pop.: 180,527
55.5 sq. mi.

Lieutenant Sam Trujillo
Albuquerque Fire Dept.
P.O. Box 258
Albuquerque, NM 87103
505-766-7884
Pop.: 350,000
95 sq. mi.

Battalion Chief W. C. Smith
Hampton Fire Division
Fire Administration Office
22 E. Lincoln St.
Hampton, VA 23669
804-727-6296
Pop.: 125,000
55 sq. mi.

Profile 8:

1. Dual-role, cross-trained
2. Career fire fighters serving as
3. EMTs on
4. Transporting ambulance vehicles
5. Without engine or truck company first response.

Chief Joseph Granson
Kokomo Fire Dept.
215 W. Superior St.
Kokomo, IN 46901
317-457-2636
Pop.: 52,000
27 sq. mi.

Lieutenant Paul G. Lalonde
Amherst Fire Dept.
68 N. Pleasant St.
Amherst, MA 01002
413-253-3431
Pop.: 31,000 (55,000 seasonal)
27.7 sq. mi.

Chief John D. Bergeron
Lexington Fire Dept.
45 Bedford St.
Lexington, MA 02173
617-862-0272
Pop.: 33,000
16 sq. mi.

Captain Jim Clark
Methuen Fire Dept.
24 Lowell St.
Methuen, MA 01844
617-685-3535
Pop.: 40,000
26 sq. mi.

Melvin Mashburn
Broken Arrow Fire Dept.
120 West Kenosha
Broken Arrow, OK 74012
918-251-5311 ext. 231
Pop.: 50,000
225 sq. mi.

Chief Paul Gagne
Newport Fire Dept.
21 West Marlborough St.
Newport, RI 02840
401-846-2213
Pop.: 38,000
7 sq. mi.

Profile 9:

1. Dual-role, cross-trained
2. Career fire fighters serving as
3. Paramedics on
4. Transporting ambulance vehicles
5. Without engine or truck company first response.

W. G. Marable
Tuscaloosa Fire Dept.
2525 - 6th St.
Tuscaloosa, AL 35401
205-758-4749
Pop.: 216,000
1340 sq. mi.

Les Saumweber
Bolingbrook Fire Dept.
375 West Briarcliff
Bolingbrook, IL 60439
312-739-0441
Pop.: 40,000
12 sq. mi.

Chief Daniel P. Bojalad
EMS Division
Detroit Fire Dept.
900 Merrill Plaisance
Detroit, MI 48203
313-224-4623
Pop.: 1.3 million
139 sq. mi.

Chief Tom Wilson
Memphis Fire Services Division
Emergency Unit Bureau
65 S. Front St.
Memphis, TN 38103
901-527-3657
Pop.: 700,000
290 sq. mi.

Profile 10:

1. Dual-role, cross-trained
2. Career and volunteer fire fighters serving as
3. EMTs on
4. Transporting ambulance vehicles
5. With engine or truck company first response.

Chief J. T. Lehnherr
King County Fire District #2
15100 - 8th SW
Seattle, WA 98166
206-242-2040
Pop.: 31,000
5.5 sq. mi.

Deputy Chief J. Lynn Harkins
EMS Director
Valdez Fire Dept.
P.O. Box 307
Valdez, AK 99686
907-835-4313
Pop.: 4,000
275 sq. mi.

Profile 11:

1. Dual-role, cross-trained
2. Career and volunteer fire fighters serving as
3. Paramedics on
4. Transporting ambulance vehicles
5. With engine or truck company first response.

Sergeant Tom Purdue
Kensington Volunteer Fire Dept.
1411 Georgia Ave.
Silver Spring, MD 20906
301-460-5006
Pop.: 120,000
35 sq. mi.

Captain Mary Beth Michos, RN
Dept. of Fire-Rescue Services
Emergency Medical Services
10025 Darnestown Rd., #101
Rockville, MD 20580
301-279-1835
Pop.: 600,000
510 sq. mi.

Bureau Chief John T. Fuston
Prince George's County Fire Dept.
Room 2132
County Administration Building
Upper Marlboro, MD 20870
301-699-2902
Pop.: 670,000
485 sq. mi.

Profile 12:

1. Dual-role, cross-trained
2. Career and volunteer fire fighters serving as
3. Paramedics on
4. Transporting ambulance vehicles
5. Without engine or truck company first response.

Battalion Chief Wesley Granruth
Baltimore County Fire Dept.
800 N. York Rd.
Towson, MD 21204
301-825-7310
Pop.: 700,000
615 sq. mi.

Roy E. Jones III
Brewster Fire Dept.
1657 Main St.
Brewster, MA 02631
617-896-7018
Pop.: 5,000 (20,000 seasonal)
24 sq. mi.

Captain Richard L. Steinberg
Fairfax County Fire-Rescue Services
4031 University Dr.
Fairfax, VA 22030
703-691-2951 (or 2126)
Pop.: 600,000
399 sq. mi.

Profile 13:

1. Dual-role, cross-trained
2. Career and volunteer fire fighters serving as
3. EMTs on
4. Nontransporting vehicles
5. Without engine or truck company first response.

Chief Bill J. Ford
Shawnee Fire Dept.
6501 Quivira Rd.
Shawnee, KS 66214
913-631-1080
Pop.: 30,000
37 sq. mi.

WE WANT TO KNOW . . .

if a name, an address, or a phone number has changed; if there's an upcoming event, a new program or course, a new publication being offered. If you have more current information than is contained in this *Almanac*, know something that should be included in this book, or just have something interesting about the fire protection scene that you want to contribute, please let us know. Write: Editor, *Fire Almanac*, NFPA, Batterymarch Park, Quincy, MA 02269. All suggestions will receive our careful attention.

Profile 14:

1. Dual-role, cross-trained
2. Career and volunteer fire fighters serving as
3. Paramedics on
4. Nontransporting vehicles
5. Without engine or truck company first response.

Lieutenant Edwin B. White
Conyers Fire Dept.
P.O. Box 518
Conyers, GA 30207
404-483-6717
Pop.: 7,618
5.27 sq. mi.

Profile 15:

1. Dual-role, cross-trained
2. Career fire fighters serving as
3. Paramedics on
4. Transporting ambulance vehicles
5. Using MEDIC COMPANY approach wherein combination fire-EMS companies provide opportunity for promoted EMS personnel to continue serving in EMS role while functioning as engineers, drivers, or company officers.

Richard E. Stallo
Gadsden Fire Dept.
90 Broad St., Room 216
Gadsden, AL 35901
205-547-8494
Pop.: 53,000
55 sq mi.

Phoenix, AZ (see Profile 2)

Deputy Chief Tom Boylston
Deerfield Beach Fire-Rescue
928 East Hillsboro Blvd.
Deerfield Beach, FL 33441
305-427-5331 ext. 302
Pop.: 44,000
10 sq. mi.

Assistant Chief Robert Pye
St. Paul Dept. of Fire and Safety Services
101 E. Tenth St.
St. Paul, MN 55101
612-224-7811
Pop.: 280,000
55 sq. mi.

John Whitney
Salem Fire Dept.
370 Trade St., SE
Salem, OR 97301
503-588-6245
Pop.: 150,000
360 sq. mi.

Chief Paul J. Athens
Beloit Fire Dept.
524 Pleasant St.
Beloit, WI 53511
601-364-6865
Pop.: 85,000
65 sq. mi.

Profile 16:

1. Dual-role, cross-trained
2. Career fire fighters serving as
3. Paramedics on
4. Nontransporting vehicles
5. Using MEDIC COMPANY approach wherein combination fire-EMS companies provide opportunity for promoted EMS personnel to continue serving in EMS role while functioning as engineers, drivers, or company officers.

Battalion Chief Pete Cernich, Paramedic Coordinator
Littleton Fire Dept.
2255 W. Berry Ave.
Littleton, CO 80165
303-795-3800
Pop.: 107,000
43 sq. mi.

Profile 17:

1. Dual-role, cross-trained
2. Career fire fighters serving as
3. EMTs on
4. Nontransporting vehicles
5. Using MEDIC COMPANY approach wherein combination fire-EMS companies provide opportunity for promoted EMS personnel to continue serving in EMS role while functioning as engineers, drivers, or company officers.

Deputy Chief William Cantwell
Cambridge Fire Dept.
491 Broadway
Cambridge, MA 02138
617-876-0125
Pop.: 100,000
6 sq. mi.

Chief Thurman Bishop
Fayetteville Fire Dept.
155 Bow St.
Fayetteville, NC 28301
919-484-8131 (occasional transport)
Pop.: 63,500
33.2 sq. mi.

Profile 18:

1. Dual-role, cross-trained
2. Career fire fighters serving as
3. Paramedics on
4. Transporting ambulance vehicles with
5. Police paramedics as first responders in vehicles capable of transporting.

Frank Novac, Fire Paramedic Coordinator
Lansing Paramedics
3404 Lake St.
Lansing, IL 60438
312-474-2131
Pop.: 33,000
7.5 sq. mi.

Profile 19:

1. Dual-role, cross-trained
2. Career fire fighters serving as
3. Paramedics on
4. Transporting ambulance vehicles
5. With POLICE first response.

Lieutenant Otis N. Tyler
Philadelphia Fire Dept.
SEC 3rd and Spring Garden Sts.
Fire Administration Building
Philadelphia, PA 19123
215-686-4718
1.9 million
129 sq. mi.

Profile 20:

1. Dual-role, cross-trained
2. Career fire fighters serving as
3. EMTs in first response on
4. Transporting ambulance vehicles and
4. Paramedics in
6. Vehicles capable of transport.

Note: This profile represents a multi-level EMS response by fire departments. Some services listed in other profiles may also use such a multi-level approach, or variations of this approach.

Captain Jerald A. Birt
Seattle Fire Dept.
301 2nd Ave., S
Seattle, WA 98104
206-223-3057
Pop.: 500,000
94.5 sq. mi.

Deputy Chief Fred Baker
Shoreline Fire Dept.
1016 N. 175th
Seattle, WA 98133
206-546-2234
Pop.: 73,000
22 sq. mi.

William Stamm, Chief Engineer
Milwaukee Fire Dept.
711 W. Wells St.
Milwaukee, WI 53233
414-276-5656
Pop.: 637,231 (occasional transport)
95.8 sq. mi.

Profile 21:

1. Civilian
2. Career members of the fire department serving as
3. Paramedics on
4. Transporting ambulance vehicles
5. With engine or truck company first response.

B.F.C. Ramon F. Granados
District of Columbia Fire Dept.
614 H St., NW
Washington, DC 20001
201-745-2348
Pop.: 650,000
69 sq. mi.

Gerald L. Fair, EMS Director
Alexandria Fire Dept.
Emergency Medical Services
900 Second St.
Alexandria, VA 22309
703-750-6526
Pop.: 118,000
15 sq. mi.

Profile 22:

1. Civilian
2. Career members of the fire department serving as
3. Paramedics on
4. Transporting ambulance vehicles
5. Without engine or truck company first response.

Ray Williams
Metropolitan Fire Dept.
Emergency Ambulance and Rescue Division
73 Hermitage Ave.
Nashville, TN 37210
615-259-5820
Pop.: 490,000
533 sq. mi.

Terry A. Hatton MICP, Administrator-Coordinator
Huntington Emergency Ambulance Rescue Team
Huntington Fire Dept.
839 Seventh Ave.
Huntington, WV 25701
304-696-5960
Pop.: 90,000
16 sq. mi.

Profile 23:

1. Volunteer fire department with
2. EMTs on
3. Transporting ambulance vehicles
4. Without engine or truck company first response.

Assistant Chief John H. Zylma
Gravel Ridge Fire Dept.
P.O. Box 166
Gravel Ridge, AR 72076
501-835-4518
Pop.: 5,000
6 sq. mi.

Chief Jerry Renchin
Falcon Heights Fire and Rescue
1644 West Lappenteur Ave.
Falcon Heights, MN 55113
612-644-5050
Pop.: 6,000
2.5 sq. mi.

Profile 24:

1. Volunteer fire department with
2. Paramedics on
3. Transporting ambulance vehicles
4. Without engine or truck company first response.

R. S. Rockenbach, EMS Manager
Grayslake Fire Dept.
P.O. Box 81
Grayslake, IL 60030
312-223-8960
Pop.: 13,000
22.5 sq. mi.

Chief Lanee Russell
Peotone Fire Dept.
Peotone, IL 60468
312-258-6824
Pop.: 6,000
80 sq. mi.

Profile 25:

1. Volunteer fire department with
2. EMTs on
3. Nontransporting vehicles
4. Without engine or truck company first response.

Dick Ash, EMS Manager
Pleasant Hill Fire Dept.
36024 Highway 58
Pleasant Hill, OR 97401
503-747-8016
Pop.: 5,052
22.5 sq. mi.

James W. Graue, EMS Manager
Spokane County Fire District #8
Valleyford, WA 99036
509-922-3869

Lieutenant Richard Martin
Seaside Volunteer Fire Dept.
851 Broadway
Seaside, OR 97138
503-738-5511
Pop.: 5,750
12 sq. mi.

Profile 26:

1. Volunteer fire department with
2. Paramedics on
3. Nontransporting vehicles
4. Without engine or truck company first response.

Jerry Celeste, EMS Manager
Southern Platte Fire Protection District
Box 12046
Parkville, MO 64152
816-741-2900
Pop.: 3,000
50 sq. mi.

While the next two profiles are not strictly fire-EMS programs, they are included for your reference.

Profile 27:

Public Safety Officer (PSO) (combination police, fire, EMS).

Charles Tice
Oak Park Public Safety
13600 Oak Park Blvd.
Oak Park, MI 48237
313-547-1337
Pop.: 32,000
5.5. sq. mi.

Profile 28:
Third Service.

Leslie Hichambottom, Administrative Technician
Public Safety Agency, City of Pasadena
175 N. Marengo Ave.
Pasadena, CA 91101
213-577-4680
Pop.: 115,000
23 sq. mi.

Sue Edwards, Acting Director
City of Austin
EMS Dept.
P.O. Box 1088
Austin, TX 78767
512-473-6461 ext. 5136
Pop.: 400,000
1,000 sq. mi.

Chief Adrian C. Morrman
Dept. of Public Health
Paramedic Division
135 Polk St.
San Francisco, CA 94102
415-553-1574
Pop.: 650,000
49 sq. mi.

State EMS Directors and Training Coordinators

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Arthur Harmon, Director
Thomas Adams, Coordinator
State Department of Health
Bureau of EMS
746 Adams Ave.
Montgomery 36104
205-832-3935

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Matt Anderson, Coordinator
EMS Section
Division of Public Health
Pouch H-06C
Juneau 99811
907-465-3027

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Michael J. Krentz, MD, Chief
Doug Allen
Office of EMS
State Department of Health Services
1740 W. Adams St., Room 101
Phoenix 85007
602-255-1094

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Michael Hampton, Director
Carolyn Schmidt, Coordinator
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Department of Health
4815 W. Markham St.
Little Rock 72201
501-661-2262

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George V. Moorhead, Interim Director
Chief Administrative Deputy
EMS Authority
State of California
1600 9th St., Room 460
Sacramento 95814
916-322-4336

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EMS Division
Colorado Department of Public Health
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Denver 80220
303-320-8333

Betti Rieber, Coordinator
Colorado Department of Health
EMS
4210 E. 11th Ave.
Denver 80220
303-393-0038

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Chris Gentile, Director
Office of Emergency Medical Services
79 Elm St.
Hartford 06106
203-566-7365

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EMS, Department of Health & Rehabilitation
1317 Winewood Blvd.
Room 110, Building 8
Tallahassee 32301
904-487-1566 or 1617

Paulette Newman / Freida Travis
EMS Section
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Room 110, Building 8
Tallahassee 32301

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Charles Bensen, Jr., Coordinator
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404-894-5170

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734-9912

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Agana 96910

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275 E. Main St.
Frankfort 40601
502-564-7996

Tommy Thompson, Coordinator
EMS, Bureau of Health Services
Department of Human Resources
275 E. Main St.
Frankfort 40601
502-564-8950

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Dana Sanders, Coordinator
Bureau of EMS
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200 Lafayette St., Suite 600
Baton Rouge 70801
504-342-2600

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Patrick Cote, Coordinator
EMS, Bureau of Health
Department of Human Services
295 Water St.
Augusta 04330
207-289-3953

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Department of Health & Mental Hygiene
22 S. Greene St.
Baltimore 21201
301-528-6846

Lou Jordan, Coordinator
Emergency Training Association
3 Dorothy
Baltimore 21221
301-682-4920 (Home)
301-528-7800 (Office)

William Neal, Jr.
Testing & Certification
Maryland Institute for EMS
22 S. Greene St.
Baltimore 21201
301-528-3666

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Sylvia Queen, Director
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Office of EMS
80 Boylston St., Room 725
Boston 02116
617-727-0564

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State Department of Public Health
P.O. Box 30035
Lansing 48909
517-373-1406

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717 Delaware St., SE
Minneapolis 55440
612-296-5282

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603-271-4564

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APO
City Colleges of Chicago
HQ-Usafe-Dpped
APO, NY 09633
Phone: Weisbaden Military 3284

Source: The National Registry of Emergency Medical Technicians

EMS Associations

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Basking Ridge, NJ 07920
201-766-2273

American Academy of Orthopedic Surgeons
Charles V. Heck, Executive Director
444 N. Michigan Ave.
Chicago, IL 60611
312-822-0970

American Ambulance Association
Robert L. Phillips, Executive Vice President
1401 21st St., Suite 404
Sacramento, CA 95814
916-448-5223

American Association for Respiratory Therapy
Sam Giordano, RRT, Executive Director
1720 Regal Row, #112
Dallas, TX 75235
214-630-3540

American Association of Critical Care Nurses
Dr. Edward Shaw, MBA, PhD, Executive Director
P.O. Box C-19528
Irvine, CA 92713
714-752-8191

American Board of Emergency Medicine
Benson Munger, PhD, Executive Director
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American College of Emergency Physicians
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American College of Surgeons
Committee on Trauma
Charles Rollins Hanlon, MD, FACS, Director
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Chicago, IL 60611
312-664-4050

American Medical Association
Commission on Emergency Medical Services
James H. Sammons, MD, Executive Vice President
535 N. Dearborn St.
Chicago, IL 60610
312-751-6000

American Red Cross
C. P. Dail, National Director
Safety Services
George Elsey, President
17th & D Sts., NW
Washington, DC 20006
202-737-8300

American Trauma Society
R. Adams Cowley, MD, President
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Chicago, IL 60611
312-649-1810

Emergency Care Information Center
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Wilton, CT 06897
203-762-3911

Emergency Care Research Institute (ECRI)
Joel J. Nobel, MD, Director
5200 Butler Pike
Plymouth Meeting, PA 19462
215-825-6000

Emergency Department Nurses Association
Robert J. Finnegan, Executive Director
666 N. Lake Shore Dr.
Chicago, IL 60611
312-649-0297

EMS Information Center
P.O. Box 61911
Dallas, TX 75261
214-659-0911

Emergency Medicine Residents' Association
Kathryn Dykgraff, Staff Liaison
P.O. Box 61911
Dallas, TX 75261
214-659-0920

International Association of Fire Chiefs
Donald D. Flinn, General Manager
1329 18th St., NW
Washington, DC 20036
202-833-3420

International Association of Fire Fighters
Jack Gannon, President
1750 New York Ave., NW
Washington, DC 20006
202-872-8484

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Source: Fire Service EMS Program Management Guide, ACT Foundation, FEMA, 1980.

Fire Service References

Significant Legal Cases Affecting the Fire Service

In recent years, the fire service has been greatly affected by activities in the courtroom. This section will list and discuss a number of the more significant decisions which will have and are already having, an effect on the fire service. No attempt is made to be exhaustive in any specific area or to touch on every area of interest. However, this section should indicate the major trends of the law in a specific area and could serve as a basis for further research. If an actual problem with legal implications exists, a municipal attorney, if available, or a private attorney should be consulted.

Retrospective Enforcement of Codes and Ordinances

When a local code or ordinance is passed requiring owners of certain property to upgrade their facilities, there are those who feel the financial burden is more than they should be asked to bear. Perhaps the leading article on this issue is one by Prof. Vincent M. Brannigan which appeared in the November 1981 issue of *Fire Journal.* A reading of this article is recommended for a more in-depth treatment.

There are a number of cases in this area of which *Queenside Hills* v *Saxl*, 328 U.S. 80, 55 S.Ct. 850 (1946) may be the most important. This case, which was decided by the U.S. Supreme Court, evolved when a New York lodging house that was built to 1940 codes, was required to make alterations to meet a 1944 ordinance. The owner sued, claiming that his rights to due process of law and equal protection of the laws was violated. Justice Douglas wrote a rather brief and direct opinion in which he dealt with these two arguments and upheld the constitutionality of the ordinance. As to due process, he felt the legislature should decide what regulations they would require to minimize fire hazards. He pointed out that the new ordinance was drawn under the police power, the general power to protect public health and safety. Douglas called the police power one of the least limitable of governmental powers which often cuts down property rights.

Although the decision contained a sweeping statement, which might have wide application, it said, "But in no case does the owner of property acquire immunity against exercise of the police power because he constructed it in full compliance with the existing law." Dealing with the equal protection argument, the Court said that in the absence of an actual class of houses that escape the law, this argument will fail.

The *Saxl* case identified the principle which underlies the area of retrospective code enforcement, the rejection of the equal protection argument, and the deferral to legislative wisdom operating under broad sweep of the police power. The courts will, however, void a code or ordinance where they find it has no relation to the legislative objective. This was the case in *Leathers* v *City of Burns*, 444 P. 2nd 1010 (1968), an Oregon case brought to challenge two ordinances of the City of Burns. One ordinance limited the size of gasoline tank trucks, the other limited the quantity of underground gasoline storage. The Court saw its function not as determining the wisdom of the legislation, but rather they felt they could strike down the ordinance only if it could be shown that it had no rational relation to its objective. On this basis, the Court upheld the ordinance regarding tank truck size, while seeming to disagree with the logic behind it. They struck down the underground storage ordinance because they found size posed no greater danger of fire. Thus, the Court perceived no connection between public safety and the storage ordinance.

While in these cases the courts have specifically disavowed any consideration of the economic consequences, leaving that to the legislature, some cases have looked to economics and balanced cost against public safety. A clear case of this attitude was found in *City of Chicago* v *Sheridan*, 40 Ill. App. 3rd 886, 353 N.E. 2nd 270 (1976), involving a firesafety ordinance which applied to a two-family house. The Illinois Appellate Court specifically found that the city had the requisite power to make codes that will have retrospective application to existing buildings. The Court, however, went on to employ a balancing test weighing cost against public safety. They deferred to a finding of a lower court which had balanced the interests in this manner and decided in favor of the property owner.

This sort of balancing of interests could be troublesome to rigorous code enforcement. But it does not seem to be widely followed and probably applied only to the case just cited. In the case of *City of St. Louis* v *Brune*, 515 S.W. 2nd 471 (1948), which also employed a balancing test, the Court noted the conflicting testimony on the issue of whether the health ordinance under review had any relation to its objective. There was a vigorous dissent which cited the principles of deference to legislative wisdom operating under the police power.

The balance of interests reasoning does not seem to be the prevalent direction of the law. The basic law in the area seems best exemplified by the principles of the *Saxl* decision. The courts will usually defer to a legislative body which is acting under the police power and the specific power to write such codes has really not been challenged. Courts will strike down ordinances and codes that have no relation to their purported objectives. The argument of financial burden has been used with some success but, generally, the courts have not employed a balancing test, leaving that to the legislative body that wrote the subject code or ordinance.

Ordinance Authority

The subject of municipal organization and authority is too broad for examination here. Rather, this section will focus on three recent areas which have dealt with the enforceability of local ordinances. These ordinances sought to restrict the actions of, or set a code of conduct for, members of the fire service. Each is a detailed decision, only capsuled here, and should be read in full if there is a relevant problem.

The case of *Davis* v *Williams*, 617 F. 2nd 1100 (1980), arose out of a dispute involving the need for additional staffing for an ambulance service that the city was taking over. The head of the local fire fighter's union made derogatory public statements about the chief and his leadership. The chief had him suspended, basing the suspension on city ordinances prohibiting a wide variety of speech concerning departmental affairs outside of in-house channels. The chief also relied on an ordinance which generally prohibited conduct prejudicial to good order. The fire fighter brought suit, and the Federal District Court declared the ordinances unconstitutional and ordered the fire fighter reinstated. The city appealed this ruling, though they apparently did reinstate the fire fighter with back pay.

The city's appeal centered on the invalidation of the ordinance which allowed discipline for "conduct prejudicial to good order." The city sought to show that the fire department was a military-type organization and, thus, military decisions upholding such general rules of conduct should apply. The Circuit Court of Appeals rejected this reasoning, pointing out that a fire department was, at best, quasi-military, and then chiefly when on actual duty. But the Court did uphold the rule. They felt that writing a rule in such broad language was the only way that an employee could be given notice that an employer "thinks himself entitled to impose punishment on grounds that are not set out with particularity."

An important aspect of the Court's decision was their analysis of the character of the employment involved and the strength of the governmental interest involved in regulating the conduct of the employee. They looked at such factors as the size, need for discipline, and function of a fire department. Based on the factors they found and the mentioned notice argument, they refused to rule the ordinance facially invalid.

The case of *Hays* v *City of Wilmington*, 451 F. Supp. 696 (1978), gave the Federal District Court in Delaware an opportunity to review an ordinance similar to the one involved in *Davis* v *Williams*. This case evolved when an off-duty fire fighter was arrested for operating under the influence of alcohol. As a result of his court appearance, the fire fighter reported five hours late for duty and initially filed an insufficient report on his whereabouts. He was suspended and not given a hearing within the department for four and one-half months. At the hearing, he was given 1,000 unpaid discipline hours to work along with five years of departmental probation. The particular provision under which he was disciplined required fire fighters to, at all times, conduct themselves in a manner which will not bring discredit to the department.

The fire fighter brought suit to have his suspension and subsequent discipline invalidated. Both the fire fighter and the city brought Motions for Summary Judgment. The Court upheld the constitutionality of the ordinance in question, based primarily on the fact that it was intended to regulate conduct, not speech. Had it been worded to involve speech, it might well have been struck down. The fire fighter brought other claims which the Court found in favor of the city. Neither the original summary procedures used for his first suspension of 10 days nor the procedure of allowing overtime unpaid hours for discipline were contrary to public policy, nor did they violate state laws against unpaid overtime, which was considered an acceptable alternative to outright unpaid suspension.

While the *Davis* and *Hays* cases have examined similar general, sweeping ordinances and upheld them, another case has taken a different view. The case of *McCallum* v *Hinson*, 489 F. Supp. 627 (1980), grew out of the suspension of a fire fighter for secretly taping a conversation between himself and his chief. The fire fighter had been active in trying to re-establish a union which had been broken after an unsuccessful strike. The chief pointed to the secret taping incident and invoked ordinances prohibiting disrespect to superior officers, conduct unbecoming a fire fighter and a gentleman, and conduct subversive of good order and the discipline of the department.

The suspended fire fighter brought suit seeking to invalidate the specific ordinance and the entire Code of Conduct which the city had written to control a whole range of actions by city fire fighters and police officers. The Federal District Court took a very sweeping view of the case. The Court found that the secret taping had violated no state or federal ordinance, and treated it as no more than repeating a conversation. The Court went on to set out in explicit detail the thought process which it felt the chief had gone through in actually suspending the fire fighter for his union activities and not for the secret taping. The Court then discussed the chilling effect that ordinances of a non-specific nature, such as those described, would have since people governed by them would be uncertain that their legitimate actions might be proscribed. Based on this "chilling effect view," the Court ruled unconstitutional each of the ordinances on which the suspension had been based as well as the city's entire Code of Conduct.

While the *Hinson* case may be an example of judicial activism, it does show that there is a fine line between those ordinances that will be upheld and those that will be struck down. This fine line may be based on the wording or application of the ordinances, but it may also be based on the views of a particular judge. Those seeking to enforce such ordinances should be well aware of the problems involved and certain that the problems have been carefully reviewed by a municipal attorney. Even with these precautions, a test of sweeping conduct ordinances can be expected.

Employer-Employee Law for the Fire Service

It would be impossible here to cover all aspects of the employment relationship as it applies to members of the fire service. In the previous section, some problems were discussed that have arisen concerning municipal ordinances and their right to control the activities of employee fire fighters. In this section, significant cases from two areas of employer-employee law will be discussed: 1. basic rights to unionize and collectively bargain, and 2. pension rights.

The case of *Beauboeuf, et al* v *Delgado College*, 428 F. 2nd 470 (1970), involved an organization of teachers employed at a state junior college. The teachers brought suit seeking to force the college to bargain collectively with them. Their suit was dismissed by the Federal District Court, and the dismissal was affirmed by the Court of Appeals on the ground that there was no law which required the college to bargain. The Court specifically said that the college's failure to agree to bargaining presented "no cognizable issue of due process or equal protection." The *Beauboeuf* case stands for the proposition that, in the absence of statute, there is no constitutional right to require the state to bargain collectively with a public employee union.

This does not mean that public employees cannot form themselves into unions. In the case of *Atkins* v *Charlotte*, 196, F Supp. 1068 (1969), a Federal District Court examined two anti-union statutes of the state of North Carolina. One statute specifically prohibited public employee labor unions, and the other statute made any agreements between a municipality and a labor union illegal. Both of these decisions were challenged by members of the Charlotte Fire Department joined by the International Association of Fire Fighters (IAFF). The Court struck down the statute prohibiting union membership as they felt it violated constitutional rights of free speech and free assembly. At the same time, the Court refused to void the statute making agreements illegal. They found nothing in the U.S. Constitution that entitles one to have a contract with another who does not want it.

Statutes in most states have now given the right to require collective bargaining and to form unions, the rights sought to be denied by the statutes examined in these two cases. Actually, strikes by members of the fire service are still widely banned. The courts have upheld the right of the states to make such a prohibition, citing the public interest involved in the continual availability of fire fighting forces. The case of *Burnley* v *Thompson*, 524 F. 2nd 1233 (1975), is an example of this concept. This case evolved when a strike by fire fighters in Macon, GA occurred over disparate pay for fire fighters and police officers. After some attempts to settle the matter, the city dismissed a number of fire fighters. Eventually, a settlement was reached under which the city agreed to rehire approximately one-third of the fire fighters to be determined by the city council. The fire fighters who were not rehired brought a civil rights suit challenging their suspensions and the rehiring procedures. The Court dealt promptly with those strikers who had been on probationary status. It was ruled that, because of their status, they had no property interest cognizable under the 14th Amendment; therefore, they had no right to complain about their summary suspensions. Turning to the regular fire fighters, the Court upheld their suspensions without hearing based on the significant public interest of the city in the prompt determination of the status of fire protection forces. Furthermore, the Court ruled that the fire fighters had no basis to object to the determinations of the city council with regard to rehiring since they had agreed to the procedure. Although, the legal action, like the strike itself, turned into a significant setback for the fire fighters, it gave the Court a good opportunity to clarify its views on an unauthorized strike.

Pension rights, while largely matters of state statute varying in each jurisdiction, have received judicial attention, the basic points of which can have more general application. In order to highlight a number of these points, full case discussion will be limited to case holdings with essential facts.

A good starting point would be the fire fighter's rights to pension benefits. In the absence of statute, there probably are no such rights, but states have universally developed some form of pension and disability laws for members of the fire service. It has been held that such pensions are not just matters for local consideration and, in fact, are something of state-wide concern. One case in Colorado - *Huff, et al* v *Mayor and City Council of the City of Colorado Springs*, 512 P. 2nd 632 (1973) - ruled that under the Colorado

Constitution, which gave the state no jurisdiction over strictly local matters, the municipality could not lower their statutory payments into a fire fighter's pension fund based on the argument that it was wholly a local matter. When allowed by statute, pensions are vested rights of the intended recipients. Thus, in the city of Idaho Falls, which by state constitution could appropriate money only on a pay-as-you-go basis except for "ordinary and necessary expenses," the pension allotments for city police officers were determined to be such "ordinary and necessary expenses." The case of *Hanson* v *City of Idaho Falls*, 446 P. 2nd 634 (1968), went on to indicate that since pensions are vested they must be deemed compensatory in nature and viewed not as gratuities but as founded on faithful, valuable services actually rendered over many years.

A case in which the vesting rationale of *Hanson* was employed was that of *Gardner* v *Nation*, 522 P. 2nd 1281 (1974). This case was brought as a result of the involuntary retirement without hearing of a fire fighter who had reached the age of 65. The fire fighter's case was based on the fact that, when be began employment, there was no such retirement age. Unfortunately for him, due to the interaction of changed requirements and his own age, he did not have sufficient years for a full pension. The Court upheld the right of the city to set a retirement age and to then retire a fire fighter without a hearing. The Court cited the *Hanson* case which held that pension plans are vested subject to reasonable modification for the purpose of keeping the plan flexible and maintaining its integrity. The fire fighter's contention was rejected and the existing pension law was determined to be applicable to his employment, even though it was enacted after he had actually commenced his employment.

The case of *Lyons* v *Workmen's Compensation Appeals Board*, 44 CA 3rd 1007, 119 Cal. Rptr. 159 (1975), was decided in part on the basis that a city charter constituted a contract between the city and its employee fire fighters. In that case, a fire fighter who had received a disability sued to receive workmen's compensation also. The Court allowed the recovery but gave the city credit for any sums paid under the disability. On appeal, that decision was upheld because the Court looked at the city charter which, they felt, contained implied notice that full double recovery was barred. The Court noted the interests of the city in preventing such double recovery and, since this Charter constituted a contract, it could be read against the fire fighters. Thus, benefits were allowed under both disability and workmen's compensation, but the sums paid under disability were credited against the amount to be received under compensation.

Courts have excluded a fire fighter from the receipt of any benefits if the fire fighter was actually discharged when application was made. This issue surfaced in the case of *Freberg* v *Board of Trustees of Firemen's Pension Fund of the City of Highland Park*, 128 Ill. App. 2nd 369, 262 N.E. 2nd 22 (1970). In this case, a fire fighter was discharged for conduct unbecoming an officer; he did not appeal the discharge. He soon made application for a non-service connected disability on the basis that he was a permanently, emotionally disturbed fire fighter. His application was denied by the Trustees of the Board, but this denial was reversed by a Trial Court. On appeal, the Illinois Appellate Court looked at the relevant state statute, particularly a phrase which read, "so as to render necessary his retirement from service." To the Court this implied that one must still be a fire fighter at the time of application. They went on to indicate that a "fire fighter means a fire fighter on active duty, on inactive duty, on a leave of absence, suspended, or retired, but not a fire fighter who has been discharged. They held that a fire fighter discharged, ceases to be a fire fighter, and any rights from such capacity are terminated.

The holding that discharge cuts off all rights to pension runs contrary to the idea of vesting. Unfortunately, since these cases were decided based on state statutes other than Constitutional principles, it is difficult to make direct comparisons between the two trains of thought.

Many cases involve appeals from adverse findings of pension fund Board of Trustees. In these cases, the standard by which the Courts will examine the Board's findings is all important. Will the Court supplant the Board's judgment on all factors with its own or will the Court defer to the Board's findings unless clearly wrong? This was examined in the case of *Reisner* v *Board of Trustees of Fire Retirement System*, 203 N.W. 2nd 812 (1973). In that case, the Court ruled that it would uphold the findings of the Board if their decision was at all justified by the evidence. There had been conflicting medical testimony in the case regarding whether or not a fire fighter was incapacitated. Since there had been evidence upholding the Board's denial of a pension, the Court affirmed the finding. Three judges argued in dissent that the medical evidence concerning incapacity was given without using the proper standard concerning incapacity for the fire fighter's work. They were indirectly arguing that evidence should be re-examined, but the majority, which narrowly viewed the court's function had foreclosed this argument.

The cases cited in this article are neither all the cases nor all the issues involved in the employer-employee relationship for fire fighters. The principles raised, however, should have some general application, covering some of the common problems faced by working fire fighters and fire officers.

Rights of Entry and Action for Fire Inspectors and Fire Fighters

When, and for what reasons, can a fire inspector or fire fighter demand entrance to private property, and what items can be seized after entry?

The Fourth Amendment to the Constitution restricts entry to property but, at the same time, inspectors need the ability to perform their work. The essence of fire fighting requires instant entry that cannot be unduly hindered. There are three Supreme Court cases which identify the perimeters of fire service authority in this area.

The first two of these cases were heard and decided together by the U.S. Supreme Court. They are *Camara* v *Municipal Court of San Francisco*, 387 U.S. 523, 18 L. Ed. 2nd 930, 87 S. Ct. 1727 (1967) and *See* v *City of Seattle*, 387 U.S. 541, 18 L. Ed. 2nd 943, 87 S. Ct. 1737 (1967). In the *Camara* case, a housing inspector demanded entrance to a first-floor business area of a building which Mr. Camara had rented. The inspector had information that Camara was living in the rear, an occupancy that was contrary to ordinance. Entrance was demanded based on a city ordinance allowing the inspector broad powers to enter and search. When Camara continued to refuse, a complaint was sought in the Municipal Court. Camara sought to prohibit the prosecution, arguing his 4th Amendment rights and the lack of a warrant. The Superior and Supreme Courts of California decided against him, but an appeal to the U.S. Supreme Court reversed the California decision and decided in his favor.

In its finding, the Supreme Court held that regulatory inspections had to be done pursuant to a warrant unless the property owner or occupant gave consent. The same principle applies to a fire code inspection. Emergency inspections are, however, exempted from the warrant requirement. Also, the warrant required does not have to meet the same rigorous standards necessary for a criminal search warrant. Rather, the Court recognized that regulatory searches are required and carried out for different reasons than for criminal searches and took the view that reasonableness would be the key criteria for a regulatory warrant. "If a valid public interest justifies the intrusion contemplated, then there is probable cause to issue a search warrant."

The case of *See* v *City of Seattle* involved a fire department code enforcement search of a locked warehouse. The Supreme Court determined that the only essential difference between this case and the *Camara* case was that this case did not involve an actual dwelling. The Court, however, found this not important enough to require a different result and required a warrant just as they had in the *Camara* case.

These two cases have set the law with regard to the regulatory search since they were decided in 1967. A more recent case discussed the rights of fire service personnel in the criminal context. *Michigan* v *Tyler*, 436 U.S. 499, 56 L. Ed. 2nd 486, 98 S. Ct. 1942 (1978), grew out of a fire in business property leased by Mr. Tyler and his partner, Mr. Tompkins.

During the final stages of the fire, some plastic containers of flammable liquid were turned over to the fire chief examining the scene, who then called in a police detective. The detective took some pictures, left, and returned later after all fire apparatus had left. Various articles were removed from the scene, and used later in a criminal trial against Tyler and Tompkins. Three weeks after the fire, a state police investigator entered the building, took pictures, and removed material which was also used against them. At the trial court, all of the material was admitted and both men were convicted of arson. The Supreme Court of Michigan later reversed the conviction and ordered a new trial, barring from evidence the material seized from the building, all of which had been taken without a warrant.

The U.S. Supreme Court took the case and agreed that there had to be a new trial. However, they examined the admissibility of evidence and did not go nearly as far as the Michigan Court in striking down admissibility. Instead, they decided that all of the material taken by the fire chief and the detective would be admissible, while material taken weeks later by the state police officer was inadmissible. Regarding the investigations by the chief and detective, the Supreme Court said that, "An entry to fight a fire requires no warrant and that, once in the building, officers may remain there for a reasonable time to investigate the blaze." On this basis, they felt that the initial activity was part of this investigation and included the later police entry because it was part of the same activity. Since an investigation of the fire scene three weeks later was beyond anything reasonable, that material would have to be stricken.

The Court indicated further that, after the initial, justifiable entry for investigation of cause, a warrant would be required and would have to be obtained under the standards established by *Camara* and *See* for regulatory searches. However, if an investigation of cause turned into a criminal investigation of arson, then a warrant under the normal criminal procedures would be required in order to demand further entry.

General search and seizure principles involving the right of an officer properly on a premises to seize evidence found have been used in a number of cases. Two notable examples of their use are *U.S.* v *Green*, 474 F. 2nd 1385 (1973), and *U.S.* v *Gorgotto*, 476 F. 2nd 1009 (1973). In each of these cases, investigations into the cause of the fire, held immediately after the fire was extinguished, turned up evidence of other crimes. In *Green*, counterfeit plates were found, while in *Gorgotto*, betting slips were found. In both cases, the material was introduced into evidence, and justified, based on the fact that the officer had a right to be on the premises, and he could, therefore, seize evidence of crime which came into his view. This is a well-known doctrine which was simply reconfirmed for the fire service.

It should be remembered that exclusion of improperly seized evidence applies only in cases involving the government. Therefore, no material excluded from a criminal trial will be admitted in a civil trial. The case of *Honeycutt* v *Aetna Insurance Co.*, 510 F. 2nd 340 (1975), evolved after the burning of a home for which Aetna refused to pay insurance, claiming arson by the homeowner. The homeowner sued, and, as part of its defense, Aetna used materials taken from the premises both by fire fighters and by Aetna's own investigators. No search warrant was issued allowing this seizure; nevertheless, the Circuit Court of Appeals ruled that material seized by public officers, even if wrongly taken, could be used in civil actions and that material taken by Aetna's own agents could also be admitted. Thus, the exclusionary rule, so important in criminal or state regulatory litigation, has no place in civil trials.

Camara, *See*, and *Tyler* are all cases with which every fire officer or inspector should be familiar. They set general guidelines on search and seizure, a difficult and often-litigated field, fraught with exceptions, and based on finely-drawn lines. Any questions on search and seizure should be raised with your municipal attorney as soon as possible. It would be unfortunate to have important evidence of arson, or some other crime, or evidence of regulatory violation, stricken from use due to the faulure of an eager investigator to properly understand the procedures to be followed.

Tort Law and the Fire Service

Torts is that branch of the civil law which deals with private wrongs between parties. In most cases, it involves an injured party seeking recompense against one who is claimed to have caused the injury. As it involves the fire service, there are two areas examined here: the areas of injuries to a fire fighter by the actions or non-actions of citizens, and injuries caused to citizens by the actions or non-actions of a fire fighter.

The state of the law concerning injuries to a fire fighter can be shown best by three cases from Illinois and two from other jurisdictions. *Dini* v *Naiditch*, 20 Ill. 2nd 406, 170 N.E. 2nd 881 (1960), involved serious injury to a fire fighter when a stair collapsed in a hotel fire. The Supreme Court of Illinois reviewed prior law which had held that a fire fighter was an invitee on property when fighting a fire, which meant that a landowner need only avoid willful or intentional injury. The Court struck down that doctrine and held that a fire fighter was an invitee to whom a landowner owed a duty of reasonable care to prevent injury. In this case, there was significant evidence of code violations, lease violations, and other activities which made the premises unsafe, so the Court allowed a jury verdict to stand in favor of the injured fire fighter. It is also important to note that the injury here was not caused by the fire itself. Rather, it was a result of a falling staircase which was found to have been poorly maintained. This case has received much attention, and its holding of a fire fighter as an invitee is a cornerstone for this area of the law.

A few years later, the case of *Netherton* v *Arends, et al*, 81 Ill. App. 2nd 391, 225 N.E. 2nd 143 (1967), illustrated the importance of the key points of the *Dini* case. In *Netherton*, an injured fire fighter brought suit based on allegations that acts such as storing flammable materials, certain acids, and ether on premises and placing large quantities of straw against the foundation were evidence of negligence, which had unreasonably increased the fire hazard. The case was dismissed on the pleadings. The Illinois Supreme Court unheld the dismissal, drawing an important distinction between injury caused by hidden defects on the premises about which the fire fighter should have been warned as opposed to the basic factors which caused the fire. The Court found that the fire fighter's allegations were "elusive" as to just how the negligence of the property owner had been the factor that caused the injury. Unless that relationship was clear, the Court held "the hazards that the fireman faced were only those hazards incidental to the employment that was his."

In these two cases the Court is saying that by the nature of the job, a fire fighter takes certain risks, and has no right to sue for risks assumed. The fire fighter will only have a right to sue if there were defects in the property of which the fire fighter could have been warned by the property owner.

In the 1976 case of *Washington* v *Atlantic Richfield Corp.*, 36 Ill. App. 3rd 344, 342 N.E. 2nd 271 (1976), the Illinois Supreme Court seemed to go one step further and expanded the rights of fire fighters to bring suit. This case involved serious injuries to a fire fighter at a gasoline station fire. Evidence was entered concerning state and local code violations as well as failure by the defendant to properly inspect the station and enforce these rules. A lower court granted Summary Judgment in favor of the defendant. The Appellate Court reversed this judgment and allowed amendments to the Complaint. The Court took the position that there could be liability when a property owner has failed to keep his premises in a reasonably safe condition, and the hazard of fire and loss of life fighting it were reasonably foreseeable. Thus, a fire fighter might have a cause of action against one who negligently maintains his premises in such a manner that creates the fire hazard. It is uncertain if other states have taken this position.

The case of *Bartels, et al* v *Continental Oil Co.*, 384 S.W. 2nd 667 (1964), dealt with the problem of fire fighters' injuries. This case involved a fire at a tank storage area. Bartels and four other fire fighters were killed when a storage tank "rocketed" 75' in a ball of flames. His widow sued and won a judgment against the oil company. The Missouri Appeals Court upheld the verdict citing that, while an experienced fire fighter would accept the presence of gasoline as a known hazard in this type of fire, the fire fighter is not expected to assume all possible lurking risks. The Court felt that liability could be based on hidden dangers where the owner or occupant had an opportunity to warn the fire fighters. The hidden dangers here were the tanks that had been in place for forty years and were equipped with 2-inch vents, although NFPA and API requirements called for 5-½-inch free circular vents. The fire fighters could not have known of the defect and, thus, there could be a finding against the oil company.

The principles of these cases involving the assuming by the fire fighter of the inherent danger of fire and certain risks that go along with the job while not assuming the risk for hidden defects of which the fire fighter had no warning seems to have evolved into what has come to be known as the "Firemen's Rule." There is not, however, universal agreement on what the rule is. Two recent cases have each used the phrase, each with a slightly different definition.

A recent Nebraska case, *Lave* v *Newmann*, 211 Neb. 97, 317 N.W. 2nd 779 (1982) defined the rule this way, "A fireman or individual fighting a fire on the premises of an owner is a bare licensee to whom the owner or occupant owes no greater duty than to refrain from injuring him by willful or wanton negligence or a designated injury, except in certain cases where there may be a duty to warn of hidden danger or peril known to the owner or occupant but unknown to or unobservable by the fireman in the exercise of ordinary care."

At the same time, another recent case, *Spargur* v *Park*, 180 Cal. Rptr. 257, indicates that the "Firemen's Rule" provides that negligence in causing fire furnishes no basis for liability to a professional fire fighter, but that the rule does not automatically bar recovery for injury in the line of duty if the injuries were caused by a separate, independent cause or circumstance.

Although these definitions of the rule are close, there are some definite distinctions. The basic principles are, however, the same. There is probably no one unequivocal statement of the "Firemen's Rule" for the whole country, but the general principles apply in most states.

The last general area to be considered in the discussion of torts is that of tort liability arising from the actions or non-actions of members of the fire service, including fire inspectors. The principle question in this area is when and under what circumstances can the plaintiff recover against the municipality. Unfortunately, there are few hard and fast universal rules to provide an answer, since the law is currently undecided about this issue. For almost every case where municipal liability is allowed, another case from another jurisdiction will deny liability on a similar set of facts. The principles, however, are worth discussing here, but ask your municipal attorney to determine the state of the law in your own jurisdiction.

Although there is no common law requirement that a municipality provide fire services, some form of local fire services are required by most states. When can the municipality be held liable if these services are delivered negligently? Historically, governmental immunity has barred such suits. This was the basis of the decision in *Heieck and Moran* v *City of Modesto*, 411 P. 2nd 105, 64 C. 2nd 229, 49 Cal. Rptr. 377 (1966). In this case a plaintiff claimed, among other things, that the city was liable for a failure to summon an available county water truck when they knew that a water main was out. The claim was found to be barred by governmental immunity.

Governmental immunity, a time-honored common law concept, is still the law in numerous jurisdictions, but it has been specifically discarded in many others. Among those states that have done away with traditional immunity, there is no single rule allowing suits for negligence against the fire service. Some states have allowed complete amenability to suit; some have looked at the potential problems involved with fire inspections and barred suits based on this activity. Still other states have generally barred suits, but have legislated a specific list of torts on which liability can be based. It will be helpful to discuss some of the distinctions which courts have found to support or distinguish from governmental immunity.

The first distinction is that of governmental vs. proprietary function. In the case of *Perkins* v *City of Lawrence*, 177 Kan. 612, 281 P. 2nd 1077 (1955), the Supreme Court of Kansas indicated that in the maintenance and operation of its fire department, a city is acting in its governmental capacity and is not liable in damages for negligence of officers or employees in performance of duties pertaining to fire departments. This seems to be a broad sweep, but the real question is what activities of the fire department are considered governmental and what are considered proprietary. In a 1964 case, *Andrade* v *City of Albuquerque*, 74 N.M. 534, 395 P. 2nd 597, it was found that the installation of the fire department alarm system was sufficiently governmental to bar recovery by a pedestrian injured by a falling cable. This result was decided even though it was not a member of the city fire service who was stringing the cable, but rather a contractor hired by the fire department. From this holding, it would seem that most all fire department activities are governmental.

However, the 1979 case of *Berkowski* v *Hall*, 282 N.W. 2nd 813, may indicate a trend towards limiting the scope of what is considered governmental activity. This case allowed a plaintiff to maintain a suit against a municipality based on alleged negligent fire department operation of emergency medical services. The Court of Appeals of Michigan felt that the operation of these EMS units was a proprietary function since they were more like the operation of a general hospital than a mental hospital; thus, a suit could be maintained. The Court had used a "governmental essence" test in determining the question of whether the activity was governmental or proprietary. Given the growth of such services, this case may have wide significance in the future.

The case of *Gianechini* v *City of New Orleans*, 410 S. 2nd 292 (1982) is noteworthy. This case involved a death after receipt of emergency medical services and was based on a particular Louisiana statute giving immunity, except in cases of gross negligence. It may not have wide application in the context of governmental vs. proprietary activity, but might be reviewed for a court's discussion of the value and effect of these services in general, and CPR in particular.

An interesting distinction from strict governmental immunity involves the time and place of the injurious activity. The case of *D'Eustachio* v *City of Beverly*, 177 N.J. Supp. 566, 427 A. 2nd 127 (1979), involved two volunteer fire companies which, in the course of a training drill, did serious water damage to a landowner's property. The Court found that the nature of the companies and their relationship to the city made them public employees, such that the city could not deny any responsibility. At the same time, as public employees, they would seem to come under a statute giving immunity for fire service activities "for the control or extinguishment of fires." The Court chose to read this conservatively and applied it only to the actual scene of a fire. Based on this reading, a suit was allowed and, since liability could be found against the individual fire companies, it would be allowed against the city.

A distinction of wider application than that used in *D'Eustachio* would be one involving discretionary vs. ministerial function. The general rule here is that there is no liability for acts causing injury which are found to be planning or discretionary functions of fire officers, but liability can be imposed for negligent ministerial acts. The Michigan case of *Stemen* v *Coffman*, 92 Mich. App. 595, 285 N.W. 2nd 305 (1979), involved a fire in a multiple-dwelling unit. Suit was brought claiming negligence against a housing inspector, the fire inspector, and the fire chief. The case was dismissed by the trial court, and the dismissal was upheld by the Court of Appeals because they felt that the activities performed were discretionary, not ministerial; thus, no liability could attach.

A similar case that reached an opposite result, would be that of *Jones* v *City of Longwood*, 404 So. 2nd 1083 (1981). This case involved a child killed when a heavy cabinet fell on her while she was playing in an abandoned building. A city ordinance required periodic inspections by the building inspector and fire chief. The trial court granted Summary Judgment in favor of the city, but this was reversed. The Appeals Court of Florida found that the required inspection activities were of an operational level and, therefore, liability could attach if it was found that the inspections were carried out in a negligent fashion.

Perhaps the most important and often-used principle that has been used to bar negligent actions is the "public duty doctrine." The underlying principle here is that, even if a duty is breached by a public officer or employee, there can be no right to recovery by the insured party unless he/she can show a breach of a duty individually owed as opposed to the duty which was owed to the public at large — duties owed to the public at large being subject to redress only in a public action. One of the first cases to use this rationale to deny recovery was that of *Matyka* v. *City of Amsterdam*, 15 N.Y. 2nd 134, 204 N.E. 2nd 635, 256 N.Y.S. 2nd 595 (1965). This case involved a residential fire that started in an oil-filled heater that had been inspected two months previously. The New York Court of Appeals noted that strict governmental immunity had been abrogated by state statute so that could not be used as a defense by the city. The plaintiff, however, had to show that the city was under a particular duty to him as a member of a class for whose special benefit the statute requiring periodic inspections was enacted. Since the plaintiff in this case could not show this special benefit arising out of the inspection statute, recovery was denied.

The public vs. private duty doctrine has been the basis of numerous other holdings in favor of the city, among them, *Duran* v *City of Tucson*, 20 Ariz. App. 22, 509 P. 2nd 1059 (1973); *Dufrene* v *Guerino*, 343 So. 2nd. 1097 (1977); *Gordon* v *Holt*, 412 N.Y.S. 2nd 534 (1979); and *Cracraft* v *City of St. Louis Park*, 279 N.W. 2nd 801 (1979). This is not an exhaustive list; other jurisdictions have such cases.

Each of the mentioned distinctions, governmental vs. proprietary, discretionary vs. ministerial, and public vs. private duty, has, basically, revolved around some form of the governmental immunity defense. However, more and more states are totally abrogating this defense, either by statute or judicial decision. It is possible that the future will see fewer distinctions regarding municipal liability for the acts of fire officers and inspectors, thus, leaving the cities and towns more liable for suit as if they were private sector employers.

A 1976 case, *Adams* v *State*, 555 P. 2nd 235, in Alaska may be a key precedent in this emerging trend. This case evolved when a fire in 1970 at the Gold Rush Hotel in Anchorage, which killed 5 people, injured 17 others, including 1 fire fighter, and completely destroyed the hotel. Plaintiff sued, claiming a negligent fire inspection and failure by the state to act after this inspection when there was a known, hazardous condition. The trial court had decided that the state could not be held liable and had granted Summary Judgment. On appeal, the Supreme Court of Alaska reversed the decision and found that there could be liability.

In their decision, the Court reviewed the whole matter in great depth, and developed a well-reasoned rationale on which to base their decision. They took the position that once an inspection has been undertaken, the state has a duty to act reasonably under the common law and that, if the plaintiff could prove at the trial that the failure to warn of known hazards was negligence, and that such negligence was a cause of the fire, the plaintiff would be entitled to recover. By this holding, which is based solely on the common law, the Court chose not to reach the statutory obligation to inspect fire hazards. Under the reasoning of the decision, having made the inspection, the state had undertaken the duty to do so reasonably. The Court rejected the argument that a public duty does not give a private right of action, because their holding was based on a common law duty and therefore the argument did not apply. The "duty-to-all means a duty to no one" is a form of sovereign immunity which the legislature of the state had abrogated. The Court even discussed the discretionary vs. ministerial argument and found that the actions were not discretionary to give rise to this defense. Commenting on the discretionary vs. ministerial defense, they felt that while the basic policy decision to undertake an activity is immune, the execution of that decision is not.

Whether *Adams* v *State* will be the trend of the future is uncertain. Since the decision was made, the case has been cited and quoted in numerous other public employee liability questions. It has not been universally adopted but it is worthy of review for its final holding and for the detailed and well-written opinion.

Fire Service Publications

California Fireman
2701 K. St., Suite 1
Sacramento, CA 95816

California State Fire Marshal Newsletter
7171 Bowling Dr., Suite 800
Sacramento, CA 95823

Carolina Rural Fireman
P.O. Box 643
New Bern, NC 28560

Chicago Fire Fighter
54 W. Randolph St.
Chicago, IL 60601

The Chief
150 Nassau St.
New York, NY 10038

Code Red Fire Newsletter
10 Baldwin St.
Meriden, CT 06450

Combustion and Flame Combustion Institute
986 Union Trust Building
Pittsburgh, PA 15219

Consumer Product Flammability
265 W. State St.
Westport, CT 06880

Embers
701 Albert St.
Englewood, OH 45322

Enjine-Enjine
P.O. Box 450
Syracuse, NY 13206

Fire Chief
40 E. Huron St.
Chicago, IL 60611

Fire Control Digest
7620 Little River Turnpike
Annandale, VA 22003

Fire Engineering
875 Third Ave.
New York, NY 10022

Fire Fighters Assn. of Missouri Newsletter
P.O. Box 473
Columbia, MO 65201

Fire Fighters News
30500 Van Dyke St.
Room 600
Warren, MI 48093

Fire Journal®
National Fire Protection Association
Batterymarch Park
Quincy, MA 02269

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225 Broadway
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Fire Marshals' News Letter
c/o Ohio State Fire Marshal
8895 E. Main St.
Reynoldsburg, OH 43068

Fire News
National Fire Protection Association
Batterymarch Park
Quincy, MA 02269

Fire Prevention and Fire News
P.O. Box 381
Mandan, ND 58554

Fire Research Abstracts and Reviews
c/o Committee on Fire Research
National Academy of Sciences
2101 Constitution Ave. - JH-312
Washington, DC 20418

Fire Retardant Chemistry
265 W. State St.
Westport, CT 06880

Fire Service Information
Engineering Extension Service
Iowa State University
Ames, IA 50011

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National Fire Protection Association
Batterymarch Park
Quincy, MA 02269

Fire Station Digest
6830 - 26th St. NE
Seattle, WA 98115

Fire Technology
National Fire Protection Association
Batterymarch Park
Quincy, MA 02269

Fire Times
1100 N.E. 125th St.
North Miami, FL 33161

Fire and Security Directors
614 Superior Ave., W
Cleveland, OH 44113

Firehouse
515 Madison Ave.
New York, NY 10022

The Fireline
Dept. of Fire Programs
2720 Enterprise Parkway
Suite 106
Richmond, VA 23229

Fireman
P.O. Box 22051
Memphis, TN 38122

Firemen's Grapevine
2900 W. Temple St.
Los Angeles, CA 90026

Firemen's Monthly
P.O. Box 155
Spring Lake, NJ 07762

Flame-Free Newsletter
11803 Pine Belt Dr.
Cypress, TX 77429

Flammability Institute News Bulletin
4001 W. McNichols Rd.
Detroit, MI 48221

Florida Fireman
P.O. Box 968
Avon Lake, FL 33873

From the State Capitols — Fire Administration
321 Sunset Ave.
Asbury Park, NJ 07712

Georgia Firefighter
P.O. Box 1623
Decatur, GA 30030

Hose Line
P.O. Box 211
Martinsville, VA 24112

Hudson Valley Fireman
166 Main St.
Hudson Falls, NY 12839

Indiana Volunteer Fireman
P.O. Box 437
Crown Point, IN 46307

Industrial Fire and Security Report
P.O. Box 1067
Silver Spring, MD 20901

International Fire Chief
1329 - 18th St. NW
Washington, DC 20036

International Fire Fighter
1750 New York Ave. NW
Washington, DC 20006

Iowa Smoke Eater
P.O. Box 118
Pierce, NE 68767

Minnesota Fire Chief
276 E. Sixth St.
St. Paul, MN 55101

Minnesota Smoke Eater
P.O. Box 118
Pierce, NE 68767

National Assn. of Fire Investigators Newsletter
53 W. Jackson Blvd.
Chicago, IL 60604

Nebraska Smoke Eater
P.O. Box 118
Pierce, NE 68767

New England Fire and Rescue Magazine
16 Joslin St.
Providence, RI 02909

Northeastern Fire Fighter
P.O. Box 368
Ithaca, NY 14850

Oregon Fire Service Bulletin
c/o Oregon State Fire Marshal
103 Labor and Industries Building
Salem, OR 97310

South Dakota Fire Eater
c/o State Fire Marshal Department
Capitol Building
Pierre, SD 57501

Speaking of Fire
c/o International Fire Service Training Association
Oklahoma State University
Stillwater, OK 74078

Tarheel Firefighter
P.O. Box 643
New Bern, NC 28560

Tennessee Fireman
P.O. Box 90450
Nashville, TN 37209

Tennessee Fireman's Journal
P.O. Box 3
Columbia, SC 29202

Virginia Fireman
105 Arrollton Dr.
Hamptom, VA 23366

Volunteer Fireman
Dalton, NY 14836

Vulcan Newsletter
Vulcan Hall
739 Eastern Parkway
Brooklyn, NY 11213

Western Fire Journal
9072 E. Artesia Blvd. - Suite 7
Bellflower, CA 90706

WNYF
c/o New York City Fire Department
110 Church St.
New York, NY 10017

EMS/EMT Publications

Annals of Emergency Medicine
3900 Capital City Blvd.
Lansing, MI 48906

Emergency
P.O. Box 159
Carlsbad, CA 92008

Emergency Alert
1730 S. Bumby Ave.
Orlando, FL 32806

Emergency Medical Services
12849 Magnolia Blvd.
N. Hollywood, CA 91607

Emergency Medicine
280 Madison Ave.
New York, NY 10016

EMS Communicator
400 Danbury Rd.
Wilton, CT 06897

JEMS (Journal of Emergency Medical Service)
215 S. Highway 101
Suite 207
Solaro Beach, CA 92075

Maryland Rescue Journal
P.O. Box 3052
Baltimore, MD 21229

New England Fire & Rescue Magazine
16 Joslin St.
Providence, RI 02909

North Carolina Emergency News
P.O. Box 553
Greenville, NC 27834

Rescue
1730 S. Bumby Ave.
Orlando, FL 32806

Trauma Line
Maryland State Ambulance and Rescue Association
P.O. Box 3052
Baltimore, MD 21229

Radio Frequencies for Major Metropolitan Cities and Areas

Key to Service Characteristics

Emergency Medical Service (EMS)

Service Provided	**Primary Source of Service**
1: First Responder	F: Fire Department
2: BLS Transportation	P: Police Department
3: ALS (paramedic)	S: Separate public agency
4: ALS Transportation	C: Private Ambulance
	H: Hospital

Numbers (1,2,3,4) indicate type of service provided. Letters (F,P,S,C,H) indicate source of each service provided.

For example, "1F; 2–4S" means that the fire department is usually the first responder on medical emergencies; that a separate public agency provides BLS transportation, Advanced Life Support (ALS), and ALS transportation.

The following frequencies in the U.S. are used for voice communications and biomedical telemetry between EMS units in the field and hospital-based physicians:

Channel Name	**Base Transmitter Frequency**
Med 1	463.000
Med 2	463.025
Med 3	463.050
Med 4	463.075
Med 5	463.100
Med 6	463.125
Med 7	463.150
Med 8	463.175

911 System

911:	911 in place
E911:	911 enhanced by certain data accompanying each 911 call. Two levels of such data are now generally tariffed: *Automatic Number Identification* (ANI)—Caller's telephone number; and *Automatic Location Identification* (ALI)—Caller's Address. This data is displayed to the receiving 911 operator at the time of the call.
911P:	911 in planning
E911P:	E911 in planning

Alarm Box System

BOXES:	Unspecified type of alarm box system
BOX–1:	Street/Master telegraph boxes
BOX–2:	Street voice boxes
BOX–3:	Street telegraph and voice boxes
BOX–4:	Master boxes in buildings only
RF:	Radio box system
BOX–R:	Street boxes removed recently (date if known)

Computer-Aided Dispatch

CADS:	Computer-Aided Dispatch
CAD–P:	CAD in planning (implementation date if known)

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if a name, an address, or a phone number has changed; if there's an upcoming event, a new program or course, a new publication being offered. If you have more current information than is contained in this *Almanac,* know something that should be included in this book, or just have something interesting about the fire protection scene that you want to contribute, please let us know. Write: Editor, *Fire Almanac,* NFPA, Batterymarch Park, Quincy, MA 02269. All suggestions will receive our careful attention.

CHANNEL DESIGNATION	FREQUENCY	PRIMARY CHANNEL USE		SERVICE CHARACTERISTICS[2]
		POP[1]	AREA	
Akron, OH		237	408	1,2C; 3,4F 911 BOX–1 CAD–P
F1	33.740	City Fire Dispatch		
F2	33.860	County Fire Dispatch		
Med 9	462.950	EMS Coordination		
Med 10	462.975	EMS Coordination		
F1	155.340	H. E. A. R. System		
F2	155.385	Private Ambulance		
Med Channels 1 thru 8		Medical Consultation/Control		
Alameda, CA		64	733	1F; 2C 911 BOX–R
1	154.130	Primary Fire Operations		
2	154.280	Mutual Aid (Statewide)		
3	155.400	Alameda County EMS		
Albuquerque, NM		325	99	1,3F; 2,4C 911 CAD–P
1	154.400	Primary Fire Operations		
2	154.160	Fire Prevention and Backup		
3	154.310	State Fire Communications		
Anaheim, CA		210	43	1,3F; 2,4C 911
1	46.26	Primary Operations		
2	46.06	County Mutual Aid		
3	46.48	Command		
4	46.42	Backup		
Anchorage, AK		173	927	1–4F 911 BOX–4
1	154.130	Primary Fire Operations		
2	154.175	Fireground/Paging/Drill		
3	154.445	Fireground command		
4	155.160	EMS		
5	154.250	Brush/Volunteers		

[1] Resident population × 1000; often different than the population served. For example, the resident population of Boston is 640,000; the daytime population is 1,500,000.
[2] See Key.

Anne Arundel County, MD		370	440	1–4F CAD–P
1	154.010	Dispatch of units		
2	154.340	Response of units		
3	154.175	Fireground/Tactical		
4	154.280	Mutual Aid		
5	154.295	Fireground Command		
	46.500	Administrative		
	154.830	Fireground/Tactical—Portable Only		
Austin, TX		345	128	1–4S E911 CAD
1	453.100	Base/Mobile/Fireground		
2	453.150	Base/Mobile/Fireground		
3	453.500	Base/Mobile/Fireground		
4	453.775	Base/Mobile/Fireground		
5	453.900	Dispatch		
6	453.450	Administrative		
7	453.275	Tactical		
8	453.675	Tactical		
9	154.130	Mutual Aid		
Bakersfield, CA		300	8118	1F,C; 2–4C E911–P CAD
Blue	453.300	Operational and Dispatch		
Orange	453.450	Administrative/Backup		
Red	453.225	Interagency/Backup		
Yellow	453.375	Administrative/Backup		
Baltimore City, MD		786	86	1–4F BOX–1 CAD
1	154.310	Primary Base/Mobile		
2	154.370	Fireground		
3	154.385	Fireground		
4	154.325	Fireground and Paging		
5	154.415	Fire/EMS Dispatch		
6	154.145	EMS Operations		
7	153.830	Portable/portable		
8	154.280	Mutual Aid		

CHANNEL DESIGNATION	FREQUENCY	POP[1]	AREA	SERVICE CHARACTERISTICS[2]
Baltimore County, MD		672	621	1–4F 911 CAD
1	46.46	Fire Dispatch		
2	46.28	EMS and Administrative		
3	46.52	Fireground (East)		
4	46.56	Fireground (West)		
	154.28	Mutual Aid		
Birmingham, AL		275	100	1,3F; 2,4C 911 CAD
	154.190	Fire Operations		
	155.340	EMS H. E. A. R. System		
Med 9	462.950	EMS Coordination		
Med 10	462.975	EMS Coordination		
Med Channels 1 thru 8		Medical Consultation/Control		
Boston, MA		640	46	1–4S 911 E911–P BOX–3
1	483.1625	Primary Base/Mobile		
2	483.1875	Fireground/Tactical		
3	483.2125	Fireground/Tactical		
4	483.2375	Administrative		
5	453.650	Station Alerting		
6	153.890	Paging; Subway Repeater		
7	154.220	Mutual Aid		
Tac 9	462.950	EMS Administrative/Tactical		
Tac 10	462.975	EMS Dispatch		
Med Channels 1 thru 8		Medical Consultation/Control		
Buffalo, NY		350	42	1F; 2–4C 911 BOXES
	154.190	Fire Operations		
	155.340	EMS H.E.A.R. System		

Calgary, Alberta		560	235	1F; 2–4S 911 BOX–R(1979)
1	413.7125	EMS Dispatch		
2	413.3375	Fire Dispatch		
3	413.6625	EMS Dispatch		
4	413.7875	Fire Dispatch		
Tac 5	413.1375	Fireground/Tactical		
Tac 6	413.4375	Fireground/Tactical		
Tac 7	413.5625	Fireground/Tactical		
Tac 8	413.8625	Fireground/Tactical		
Charlotte, NC		343	138	1FS; 2S 911
1	460.525	Fireground		
2	460.625	Fireground		
3	460.550	Fireground		
4	460.600	Fireground		
5	460.575	Fire Dispatch		
Chicago, IL		3200	954	1–4F E911 BOX–1R(1980) BOX–4 CAD–P
	154.130	Fire Operations—North Side		
	153.770	Fire Operations—South Side		
	154.220	Administrative		
	153.830	Fireground/Tactical		
	154.385	Fireground/Command		
	460.600	EMS Dispatch		
	460.625	EMS Mobile data terminals		
Med Channels 1 thru 8		Medical Consultation/Control		
Cincinnati, OH		383	76	1–4F BOX–1
	154.310	Primary Dispatch		
1	460.600	Fireground/Tactical		
	465.600	Fireground/Tactical		
	460.625	Fireground/Tactical		
2	465.625	Fireground/Tactical		
Med 1	463.000	Medical Consultation/Control		
Med 5	463.100	Medical Consultation/Control		
	153.830	Command/Disaster		

CHANNEL DESIGNATION	FREQUENCY	POP[1]	AREA	SERVICE CHARACTERISTICS[2]
Columbus, OH		565	183	1–4F BOX–2
1,2	154.310	Primary Fire Operations		
4	154.400	Administrative		
	155.340	EMS		
Corpus Christi, TX		231	841	1–4F BOX–RF
1	154.190	Primary Base/Mobile		
2	154.385	Station Alerting		
3	154.070	Mobile/Mobile		
5	154.995	Administrative		
6	462.950	EMS Dispatch		
7	462.975	Ambulance to Hospital Call-In		
8	463.175	Biomedical Telemetry		
9	463.100	Biomedical Telemetry		
10	463.025	Biomedical Telemetry		
11	463.150	Biomedical Telemetry		
Dallas, TX		904	378	1–4F CAD
1	154.070	Paging and Backup		
2	154.445	EMS Operations		
3	154.220	Fire Operations		
4	154.340	Fireground/Tactical		
6	465.575	Station Alerting		
Med Channels 1 thru 4		Medical Consultation/Control		
Dayton, OH		203	459	1–4F BOX–R CAD–P
1	154.430	Fire and EMS Dispatch		
2	154.430	Fire and EMS Tactical		
3	154.175	Fireground/Tactical		
4	154.280	Mutual Aid		
6	155.340	EMS/BLS Working (Primary)		
7	155.400	EMS/BLS Working		

8	155.325	EMS/BLS Working		
9	155.280	Statewide Hospital/Squad/Command		
10	155.805	Statewide Common Disaster		
Med 9	462.950	EMS Dispatch		
Med 10	462.975	EMS Command and Control		
Denver, CO		491	24	1FH: 2–4H BOX–1RF 911
1	154.310	Base/Mobile Dispatching		
2	154.070	Pagers/Mobile/Multi-alarm Fires		
3	155.955	Siren Activation and Service Channel		
4	154.280	Mutual Aid		
Des Moines, IA		191	578	1,2F
1	460.625	Fire Dispatch		
2	460.575	EMS		
3,4	460.600	Administrative/Fireground		
Detroit, MI		1200	139	1–4F 911 BOX–R*
F 1,2	154.31	Primary Base/Mobile		
F 3,4	154.40	Fireground/Tactical		
	155.16	EMS		
Edmonton, Alberta		534	263	1–4S 911 CAD
1	413.1125	Fire Dispatch/Operations		
2	413.1625	Fire Dispatch/Operations		
3	413.7875	Fireground/Tactical		
4	413.8375	Fireground/Tactical		
5	413.8625	Fireground/Tactical		
6	413.9625	Fireground/Tactical		
7	413.0375	Data (Hard Copy Dispatch)		

*Of Detroit's 4,000 telegraph boxes, less than 900 remain. Of those, 170 are street boxes at firehouses or in the business district. The rest are master boxes in buildings.

CHANNEL DESIGNATION	FREQUENCY	POP[1]	AREA	SERVICE CHARACTERISTICS[2]
El Paso, TX		420	240	1F; 2–4S 911 BOX–R(1980)
1	154.325	Primary Fire Dispatch/Operations		
2	154.445	Administrative		
	453.750	Station Alerting		
Med 9	462.950	EMS Dispatch		
Med 1	463.000	Medical Consultation/Control		
Med 3	463.050	Medical Consultation/Control		
Med 4	463.070	Medical Consultation/Control		
Med 5	463.100	Medical Consultation/Control		
Fairfax, VA		19	399	1–4F 911 CAD–P
	46.080	Volunteer Tone Alerting		
1	460.575	Primary Dispatch		
2	460.600	Fire Marshal and EMS		
3	460.625	Mutual Aid and EMS (N. Virginia)		
	154.280	Mutual Aid (Metro. Washington area)		
	154.265	Mutual Aid (N. Virginia)		
Flint, MI		159	642	1–4F BOX–1
1	153.890	EMS/Fire Dispatch		
2	154.235	Administrative/Backup		
3	154.280	Mutual Aid		
4	155.160	County/City Paramedic Coordination		
Fort Worth, TX		400	240	1F: 2–4C BOX–R(1972) CAD–P(1984)
1	460.525	Tactical Support		
2	460.550	Fireground/Tactical (Primary)		
3	460.600	Fireground/Tactical (Secondary)		
4	460.650	Administrative/Tactical		
5	465.550	Fireground/Tactical (portables)		
Alarm	154.250	Fire Dispatch (tone alert)		
County	46.060	Mutual Aid		

Grand Rapids, MI		181	857	1P; 2C 911
	153.950	Mobile to Base		
	154.140	Base to Mobile		
	154.370	Area Fire Dispatch (Tone Alert)		
Halifax, NS		280	24.19	1FPH; 2–4H BOXES
1,2	413.3870	Primary Fire Operations		
3,4	413.8620	Secondary Fire Operations		
5	414.312	Administration		
Hamilton, Ontario		306	54	1FS; 2S 911 CAD–P
1	154.830	Township Fire Operations		
2	154.070	Ontario Fire Marshal		
3	154.830	City Fire Operations		
4	162.915	Mobile Repeaters		
	149.100	Provincial EMS		
	152.150	Hamilton-Wentworth EMS		
Hartford, CT		136	739	1FPC; 2C BOX–3
	154.310	Primary Base/Mobile		
	155.940	Administrative		
	153.830	Fireground/Tactical		
Honolulu City and County, HI		822	604	1FS; 2–4S 911 BOX–R(1980)
Control	154.220	Fire/Rescue Operations (metropolitan)		
Control	154.340	Fire/Rescue Operations (rural)		
Houston, TX		1900	566	1–4F E911–P BOX–1 CAD
F 6	460.525	EMS Dispatch		
F 7	460.550	EMS Backup		
F 8	460.575	Fire Dispatch		
F 9	460.625	Fireground/Backup		
Indianapolis, IN		505	81	1–4F 911 BOX–R(1978)
1	153.770	Fire Dispatch		
2	154.070	Unit to Unit		
3	154.175	Fireground/Tactical		

CHANNEL DESIGNATION	FREQUENCY	POP[1]	AREA	SERVICE CHARACTERISTICS[2]
Jacksonville, FL		600	844	1–4F BOX–R CAD
1	460.575	Primary Fire Operations		
2	460.600	Secondary Fire (Patched to Channel 5 for EMS)		
3,4	460.625	Fireground/Tactical		
5	462.950	EMS Dispatch (Primary)		
6	462.975	EMS Dispatch (Secondary)		
7	463.075	Medical Control/Consultation		
8	463.125	Medical Control/Consultation		
9	463.150	Medical Control/Consultation		
10	463.175	Medical Control/Consultation (Statewide)		
11	154.445	Station Alerting		
12	153.755	Civil Defense		
13	155.340	Hospital Disaster Coordination		
Jersey City, NJ		243	19	1P; 2–4S BOX–2
1	460.550	Dispatch/Tactical		
2	460.600	Dispatch/Tactical		
London, Ontario		86	25	1,2C 911
1	154.370	Fire Dispatch/Tone Alert/Tactical Middlesex County Mutual Aid		
2	154.070	Administrative/Fireground/Tactical (Ontario Fire Marshal)		
3	154.950	Administrative/Fire Dispatch/Tone Alert/Tactical		
4	154.635	Fireground/Tactical		
	160.095	Fireground Repeater		
1	414.2125	Fireground Repeater (Backup)		
3	414.6625	Fireground Repeater (Backup)		

Los Angeles City, CA		2900	454	1–4F	E911–P(1984)	CAD
1	506.3125	Fireground/Tactical—Div. 1				
2	506.5375	Fireground/Tactical—Div. 2				
3	506.9125	Fireground/Tactical—Div. 3				
4	506.1375	Rescue Ambulances—Metro Area				
5	506.6375	Fireground/Tactical (Brush)				
6	507.0125	Fireground/Tactical (Brush)				
7	33.700	Fire Operations—Metro Area				
8	33.820	Fire Operations—Valley Area				
9	33.940	Special Operations (Brush)				
10	33.90,48,86	Mobile Digital Status System				
11	33.600	Command				
12	33.560	Command				
13	33.520	Command (Car-to-Car)				
HEAR 1	155.280	EMS/Hospital				
HEAR 2	155.340	EMS/Hospital				
Med Channels 1 thru 8		Medical Consultation/Control				
Los Angeles County, CA		2269	2190	1,3F; 2,4C	E911–P(1984)	CAD
1	154.430	Fire/EMS Dispatch—Los Angeles Basin				
2	154.340	Fire/EMS Dispatch and Tactical—San Gabriel Valley				
3	154.400	Fire/EMS Dispatch and Tactical—Antelope Valley, Newhall-Saugus, Malibu				
Tac 5	154.295	Fireground/Tactical—Los Angeles Basin				
Tac 6	154.280	Statewide Mutual Aid				
Med Channels 1 thru 8		Medical Consultation/Control				
Miami, FL		365	395	1F; 2C; 3–4F	E911	CAD
A	453.100	Fire Dispatch				
B	453.150	Fireground/Tactical				
C	453.200	Fire Administrative				
D	453.425	EMS Dispatch				
	453.325	EMS Administrative				
	453.900	Mobile Telephone				
	851.2875	Mobile Status/Display Terminals				

CHANNEL DESIGNATION	FREQUENCY	POP[1]	AREA	SERVICE CHARACTERISTICS[2]
Milwaukee, WI		633	96	1F; 2C; 3–4F BOX–1
1	154.130	Fire Dispatch		
2	153.950	Fire Mobile/Portable		
3	153.770	EMS Mobile/Portable		
4	154.385	EMS Dispatch		
5	153.830	Fireground Portable		
6	154.295	Mutual Aid		
Med Channels 1 thru 8		Medical Consultation/Control		
Minneapolis, MN		375	58	1F; 2–4S E911 CAD
1,2	154.340	Primary Fire Operations		
3	154.235	Administrative/Backup		
4	154.295	Mutual Aid		
5	153.830	Portable/Portable Statewide		
Mississauga, Ontario		350	117	1FPS; 2S CAD–P(1983)
1	154.950	Primary Fire Operations		
2	154.235	Greater Alarms/Backup		
	158.925	Mobile Repeater		
	414.5875	Station Alerting		
	154.070	Mutual Aid		
Mobile, AL		200	1240	1,3F; 2,4C 911 BOX–RF
	160.350	Fire Operations		
Montgomery County, MD		579	495	1–4F 911 CAD–P
2	154.160	Primary Fire Operations		
1	153.950	Fireground		
3	154.280	Mutual Aid		
	462.950	EMS Intra-Jurisdiction		
Med 2	463.025	Medical Consultation/Control		

Montreal, Quebec		121	68	EMS*	BOX–R(1979)		
10–51	412.7625	Primary Fire Dispatch					
10–52	412.4875	Administrative					
10–53	413.2625	Fireground/Tactical					

*Provided by a separate provincial agency. Four nurses and one physician screen EMS calls at dispatch point. Responses by physicians in cars and EMTs in ambulances are tailored to the medical emergency.

Nashville, TN		480	530	1–4F	911	BOX–R	
1	460.600	Station Alerting					
2	460.575	Mobile/Base					
3	460.625	Mobile/Base					
4	458.950	Fireground/Tactical					
5	458.900	Fireground/Tactical					
6	154.445	Ambulance and Rescue*					
7	155.205	Base to Ambulance*					
8	155.280	Hospital to Hospital*					
9	155.340	Ambulance to Hospital*					

*Tennessee Statewide EMS Network

Newark, NJ		325	24	1–2S	911	BOX–1	
	154.13	Fire Operations					
New Orleans, LA		600	364	1–4P	BOX–2	CAD	
A	453.150	Digital					
B	460.575	Fire Dispatch					
FG1	460.600	Fireground/Tactical					
FG2	460.625	Fireground/Tactical					
New York City, NY		7100	300	1–4S	911	BOX–3	CAD
1	154.430	Fire Operations—Citywide					
2	154.250	Fire Operations—Queens					
3	154.370	Fire Operations—Brooklyn					
4	154.250	Fire Operations—Manhattan					
5	154.190	Fire Operations—Bronx, Richmond					
	153.830	Portable/Portable					

CHANNEL DESIGNATION	FREQUENCY	POP[1]	AREA	SERVICE CHARACTERISTICS[2]
Norfolk, VA		280	63	1F; 2–4S 911 CAD
1	154.190	Fire Dispatch		
2	154.235	Fireground/Tactical		
3	154.295	Mutual Aid		
	462.950	EMS Dispatch		
Oakland, CA		379	53	1F; 2–4C 911 BOX–R(1978)
1	153.785	Fire Dispatch		
2	154.355	Fireground		
	154.265	Portable/Portable (simplex)*		
3	154.295	Portable/Mobile (simplex)*		
4	154.280	Base/Mobile/Portable (simplex)*		
5	154.295	Portable Repeaters; Subway Repeater*		

*Statewide Mutual Aid (FIREMARS)

CHANNEL DESIGNATION	FREQUENCY	POP[1]	AREA	SERVICE CHARACTERISTICS[2]
Oklahoma City, OK		390	335	1,3F; 2–4S CAD
1	453.150	Backup Fireground/Dispatch		
2	453.350	Primary Fireground/Dispatch		
3	453.600	Primary Fireground/Dispatch		
4	453.300	Mutual Aid		
	153.890	Mutual Aid		
	155.055	Station Alerting (voice)		
	952.200	Station Alerting (printers)		
Omaha, NE		333	92	1–4F 911
1	154.190	Primary Base/Mobile		
2	154.010	Administrative		
3	153.950	Fireground/Tactical		
4	39.820	EMS Dispatch		
Med Channels 1 thru 8		Medical Consultation/Control		

Philadelphia, PA		1688	130	1–4F 911 BOX–1 CAD–P
1	154.235	Fire Operations—South		
2	153.950	Greater Alarms		
3	154.145	Fire Operations—North		
4	153.830	Fireground Portables		
5	153.950	Fireground Portables		
6	170.150	Rescue/EMS		
7	47.540	Hospital Alerting		
Phoenix, AZ		810	330	1,3F; 2,4C E911–P CAD
1	154.190	Dispatch		
2	154.250	East		
3	154.070	West		
4	154.280	Inter-Agency		
5	153.830	Fireground		
6	154.310	Glendale		
7	154.145	Tempe		
8	153.770	Tempe		
UHF	460.575	Administrative		
MDT	852.4625	Mobile Data Terminals		
Med 3	463.050	Medical Consultation/Control		
Med 6	463.125	Medical Consultation/Control		
Med 7	463.150	Medical Consultation/Control		
Med 8	463.175	Medical Consultation/Control		
Med 9	462.950	EMS Coordination		
Quebec City, Quebec		186	30	1–4C BOX–R
	154.250	Fire Operations		
	155.520	Administrative		
	154.340	Allied Services/Paging		
Richmond, VA		219	229	1–2FC; 3–4F 911 BOX–R(1981) CAD
1	453.750	Fire Dispatch and Operations		
2	453.650	Administrative and Special Operations		
3	453.300	Fireground/Tactical		
4	154.130	Fire Dispatch (tone alert)		

CHANNEL DESIGNATION	FREQUENCY	POP¹	AREA	SERVICE CHARACTERISTICS²
Rochester, NY		225	31	1FC; 2–4C E911 BOXES CAD
1	154.130	City Fire Dispatch		
2	154.250	City/County Work Channel		
3	154.385	County Work Channel—East side		
4	153.830	Portable/Portable		
5	154.310	County Fire Dispatch		
6	154.340	County Work Channel—West side		
	155.295	County EMS Dispatch		
	155.340	Hospital/Ambulance		
St. Paul, MN		287	55	1–4F 911 BOX–R CAD–P(1984)
1	154.130	Fire/EMS Dispatch		
2	154.010	EMS Communications		
Sacramento, CA		275	975	1F; 2C BOXES
1	153.890	Base/Mobile		
2	153.950	Base/Mobile		
3	154.190	County Fire Operations		
4	154.280	Statewide Mutual Aid		
Salt Lake City, UT		250	526	1FC; 2,4C; 3F 911 BOX–1 and RF CAD
1	154.430	Base/Mobile		
2	154.310	Base/Mobile		
3	154.340	Fireground/Tactical		
	453.200	Mobile Data Terminals		
	154.415	Base/Mobile—Riverton City Fire Department		
	154.385	Base/Mobile—Sandy City Fire Department		
	460.625	Base/Mobile—West Valley City Fire Department		
	154.280	Base/Mobile—State Fire Coordinator		
St. Petersburg, FL		250	58	1,3F 911 BOX–R
1	154.070	Fire/EMS Dispatch		
2	154.205	Administrative/Fire Prevention		

3	465.575	Nozzle/Pump operators		
4	154.430	Mutual Aid		
San Antonio, TX		750	267	1–4S 911 CAD–P
1	154.430	Fire Dispatch/Fireground Tactical		
2	154.355	Fire Prevention/Administrative		
3	155.220	EMS Dispatch/Administrative		
4	155.340	EMS Medical/Hospital (Voice)		
BMR 1	453.700	EMS (Portable Voice) Clinical		
BMR 2	453.750	EMS (Portable Voice) Clinical		
BMR 3	453.850	EMS (Portable Voice) Clinical		
Telemetry 1	463.000	Biomedical Telemetry with voice		
Telemetry 2	463.025	Biomedical Telemetry with voice		
Telemetry 3	463.050	Biomedical Telemetry with voice		
San Francisco, CA		678	45	1–4S 911 BOXES CAD
1	488.3625	Base/Mobile		
2	488.5625	Base/Mobile		
3	488.7625	Base/Mobile		
4	489.1625	Fireground/Tactical		
5	489.1875	Administrative		
San Jose, CA		680	212	1F; 2–4C BOX–1R BOX–4 CAD
14	154.280	Mutual Aid		
15	154.010	Primary Dispatch		
16	155.880	Fireground/Tactical		
Seattle, WA		475	98	1–4F 911 CAD
	453.800	Fire/EMS Dispatch		
	453.600	Fireground/Tactical		
	453.700	EMS Administrative/Tactical		
Shreveport, LA		205	899	1F; 2C
1	154.310	Secondary Fire Operations		
2	154.445	Administrative		
3	154.355	Primary Fire Operations		
4	154.400	Dispatch/Administrative		

CHANNEL DESIGNATION	FREQUENCY	POP[1]	AREA	SERVICE CHARACTERISTICS[2]
Springfield, MA		152	619	1,2C 911 BOXES
	154.400	Fire Operations		
Tampa, FL		300	84	1,2S; 3,4F BOX–R(1981) CAD
1	154.340	Primary Fire Operations		
2	154.220	Greater Alarms		
Med 7	463.150	Medical Consultation/Control		
Tucson, AZ		342	102	1–4F 911 BOX–4RF
F–1	453.100	Fire Suppression		
F–2	453.200	Fire Suppression		
F–3	453.600	Fire Suppression		
F–4	453.400	Administration		
F–9	460.575	Dispatch		
	154.280	Mutual Aid		
M–1	463.000	EMS Telemetry		
M–4	463.075	EMS Telemetry		
M–6	463.125	EMS Telemetry		
M–8	463.175	EMS Telemetry		
M–3	463.050	EMSCOM (Statewide)		
M–9	462.950	Inter-Hospital		
M–10	462.975	EMS Dispatch		
Toronto, Ontario		595	241	1–4S 911
1	411.9875	Base/Mobile		
2	411.7875	Fireground/Tactical		
3	417.6625	Mobile Repeater		
4	411.8625	Fireground/Tactical		
5	417.7125	Mobile Repeater		
6	412.8125	Fire Marshal		
7	412.3125	Administrative		
Dispatch 1	414.7625	Fire Dispatch (tone alert)		
Dispatch 2	415.3125	Fire Dispatch (tone alert)		

Vancouver, BC		410	44	1F; 2–4S 911 BOX–1R, BOX–4
1	151.505	Primary Fire Operations		
2	150.635	Fireground		
	164.490	EMS (Provincial)		
Washington, DC		635	693	1–4F 911 BOX–3 CAD
	154.190	Fire Dispatch		
	154.235	Fireground/Tactical		
	154.205	Fireground/Tactical/Pager		
	154.280	Mutual Aid		
	33.060	EMS Dispatch/Tactical/Administrative		
Med Channels 1 thru 8		Medical Consultation/Control		
Winnipeg, Manitoba		556	235	1FS; 2S 911 BOX–R(1980) CAD
1	413.1625	Primary Fire Operations		
2	413.0125	Fireground/Tactical		
3	413.4125	Fireground/Tactical		
4	413.6250	Fireground/Tactical		
Wichita, KS		280	91	1F; 2–4S 911
A	154.415	Fireground/Tactical		
B	154.190	Administrative/Fireground		
Worcester, MA		161	1509	1FP; 2–4H 911 BOX–4
F1,2	460.525	Primary Fire Operations		
F3,4	460.575	Administrative/Fireground/Paging		
	33.860	Fire Prevention/Maintenance		
	33.700	Mutual Aid—North County		
	33.620	Mutual Aid—South County		
Yonkers, NY		195	21	1P; 2C BOX–R(1980)
1	46.500	Primary Base/Mobile		
2	46.260	Mutual Aid		
	465.600	Fireground/Tactical—Portables		

Summary of Service Characteristics

911 Systems in Place	POP[1]	AREA	
Akron, OH	237	408	1,2C; 3,4F 911 BOX–1 CAD–P
Albuquerque, NM	325	99	1,3F; 2,4C 911 CAD–P
Anaheim, CA	210	43	1,3F; 2,4C 911
Anchorage, AK	173	927	1–4F 911 BOX–4
Birmingham, AL	275	100	1,3F; 2,4C 911 CAD
Boston, MA	640	46	1–4S 911 E911–P BOX–3
Buffalo, NY	350	42	1F; 2–4C 911 BOX
Calgary, Alberta	560	235	1F; 2–4S 911 BOX–R(1979)
Charlotte, NC	343	138	1FS; 2S 911
Denver, CO	491	24	1FH; 2–4H BOX–1RF 911
Detroit, MI	1200	139	1–4F 911 BOX–R
Edmonton, Alberta	534	263	1–4S 911 CAD
El Paso, TX	420	240	1F; 2–4S 911 BOX–R(1980)
Fairfax, VA	19	399	1–4F 911 CAD–P
Grand Rapids, MI	181	857	1P; 2C 911
Hamiliton, Ontario	306	54	1FS; 2S 911 CAD–P
Honolulu City and County, HI	822	604	1FS; 2–4S 911 BOX–R(1980)
Indianapolis, IN	505	81	1–4F 911 BOX–R(1978)
London, Ontario	86	25	1,2C 911
Mobile, AL	200	1240	1,3F; 2,4C 911 BOX–RF
Montgomery County, MD	579	495	1–4F 911 CAD–P
Nashville, TN	480	530	1–4F 911 BOX–R
Newark, NJ	325	24	1–2S 911 BOX–1
New York City, NY	7100	300	1–4S 911 BOX–3 CAD
Norfolk, VA	280	63	1F; 2–4S 911 CAD
Oakland, CA	379	53	1F; 2–4C 911 BOX–R(1978)
Omaha, NE	333	92	1–4F 911
Philadelphia, PA	1688	130	1–4F 911 BOX–1 CAD–P
St. Paul, MN	287	55	1–4F 911 BOX–R CAD–P(1984)

Salt Lake City, UT	250	526	1FC; 2,4C; 3F 911 BOX–1 and RF CAD
St. Petersburg, FL	250	58	1,3F 911 BOX–R
San Antonio, TX	750	267	1–4S 911 CAD–P
San Francisco, CA	678	45	1–4S 911 BOXES CAD
Seattle, WA	475	98	1–4F 911 CAD
Springfield, MA	152	619	1,2C 911 BOXES
Tucson, AZ	342	102	1–4F 911 BOX–4RF
Toronto, Ontario		595	241 1–4S 911
Vancouver, BC	410	44	1F; 2–4S 911 BOX–1R, BOX–4
Washington, DC	635	693	1–4F 911 BOX–3 CAD
Winnipeg, Manitoba	556	235	1FS; 2S 911 BOX–R(1980) CAD
Wichita, KS	280	91	1F; 2–4S 911
Worcester, MA	180	38	1FP; 2–4H 911 BOX–4
		TOTAL	42
E911 Systems in Place			
Austin, TX	345	128	1–4S E911 CAD
Alameda, CA	64	733	1F; 2C E911 BOX–R
Chicago, IL	3200	954	1–4F E911 BOX–1R(1980) BOX–4 CAD–P
Miami, FL	365	395	1F; 2C; 3–4F E911 CAD
Rochester, NY	225	31	1FC; 2–4C E911 BOXES CAD
		TOTAL	5
E911 Systems in Planning			
Bakersfield, CA	300	8118	1F,C; 2–4C E911–P CAD
Baltimore County, MD	672	621	1–4F E911–P CAD
Boston, MA	640	46	1–4S 911 E911–P BOX–3
Houston, TX	1900	566	1–4F E911–P BOX–1 CAD
Los Angeles City, CA	2900	454	1–4F E911–P(1984) CAD
Los Angeles County, CA	2269	2190	1,3F; 2,4C E911–P(1984) CAD
Phoenix, AZ	764	9155	1,3F; 2,4C E911–P CAD
		TOTAL	7

Alarm Box Systems

	POP[1]	AREA	
Akron, OH	237	408	1,2C; 3,4F 911 BOX–1 CAD–P
Anchorage, AK	173	927	1–4F 911 BOX–4
Baltimore City, MD	786	86	1–4F BOX–1 CAD
Boston, MA	640	46	1–4S 911 E911–P BOX–3
Buffalo, NY	350	42	1F; 2–4C 911 BOX
Corpus Christi, TX	231	841	1–4F BOX–RF
Dayton, OH	203	459	1–4F BOX–R CAD–P
Denver, CO	491	24	1FH; 2–4H BOX–1RF 911
Houston, TX	1900	566	1–4F 911–P BOX–1 CAD
Mobile, AL	200	1240	1,3F; 2,4C 911 BOX–RF
Newark, NJ	325	24	1–2S 911 BOX–1
New Orleans, LA	600	364	1–4P BOX–2 CAD
New York City, NY	7100	300	1–4S 911 BOX–3 CAD
Philadelphia, PA	1688	130	1–4F 911 BOX–1 CAD–P
Rochester, NY	225	31	1FC; 2–4C E911 BOXES CAD
Salt Lake City, UT	250	526	1FC; 2,4C; 3F 911 BOX–1 and RF CAD
San Francisco, CA	678	45	1–4S 911 BOXES CAD
San Jose, CA	680	212	1F; 2–4C BOX–1R BOX–4 CAD
Springfield, MA	152	619	1,2C 911 BOXES
Tucson, AZ	342	102	1–4F 911 BOX–4RF
Vancouver, BC	410	44	1F; 2–4S 911 BOX–1R BOX–4
Washington, DC	635	693	1–4F 911 BOX–3 CAD
Worcester, MA	180	38	1FP; 2–4H 911 BOX–4
		TOTAL	23

Alarm Box Systems Removed

Alameda, CA	64	733	1F; 2C 911 BOX–R
Calgary, Alberta	560	235	1F; 2–4S 911 BOX–R(1979)
Chicago, IL	3200	954	1–4F E911 BOX–1R(1980) BOX–4 CAD–P

Dayton, OH	203	459	1–4F BOX–R CAD–P
Detroit, MI	1200	139	1–4F 911 BOX–R
El Paso, TX	420	240	1F; 2–4S 911 BOX–R(1980)
Fort Worth, TX	400	240	1F; 2–4C BOX–R(1972) CAD–P(1984)
Honolulu City and County, HI	822	604	1FS; 2–4S 911 BOX–R(1980)
Indianapolis, IN	505	81	1–4F 911 BOX–R(1978)
Montreal, Quebec	121	68	EMS[1] BOX–R(1979)
Nashville, TN	480	530	1–4F 911 BOX–R
Oakland, CA	379	53	1F; 2–4C 911 BOX–R(1978)
Quebec City, Quebec	186	30	1–4C BOX–R
St. Paul, MN	287	55	1–4F 911 BOX–R CAD–P(1984)
St. Petersburg, FL	250	58	1,3F 911 BOX–R
San Jose, CA	680	212	1F; 2–4C BOX–1R BOX–4 CAD
Tampa, FL	300	84	1,2S; 3,4F BOX–R(1981) CAD
Vancouver, BC	410	44	1F; 2–4S 911 BOX–1R, BOX–4
Winnipeg, Manitoba	556	235	1FS; 2S 911 BOX–R(1980) CAD
Yonkers, NY	195	21	1P; 2C BOX–R(1980)
		TOTAL	20

Computer-Aided Dispatch Systems

Austin, TX	345	128	1–4S E911 CAD
Bakersfield, CA	300	8118	1F,C; 2–4C E911–P CAD
Baltimore City, MD	786	86	1–4F BOX–1 CAD
Baltimore County, MD	672	621	1–4F 911 CAD
Birmingham, AL	275	100	1,3F; 2,4C 911 CAD
Dallas, TX	904	378	1–4F CAD
Edmonton, Alberta	534	263	1–4S 911 CAD
Houston, TX	1900	566	1–4F 911–P BOX–1 CAD
Los Angeles City, CA	2900	454	1–4F 911–P(1984) CAD
Los Angeles County, CA	2269	2190	1,3F; 2,4C 911–P(1984) CAD
Miami, FL	365	395	1F; 2C; 3–4F E911 CAD
Minneapolis, MN	375	58	1F; 2–4S 911 CAD
New Orleans, LA	600	364	1–4P BOX–2 CAD

New York City, NY	7100	300	1–4S 911 BOX–3 CAD
Norfolk, VA	280	63	1F; 2–4S 911 CAD
Oklahoma City, OK	390	335	1,3F; 2–4S CAD
Phoenix, AZ	764	9155	1,3F; 2,4C 911–P CAD
Rochester, NY	225	31	1FC; 2–4C E911 BOXES CAD
Salt Lake City, UT	250	526	1FC; 2,4C; 3F 911 BOX–1 and RF CAD
San Francisco, CA	678	45	1–4S 911 BOXES CAD
San José, CA	680	212	1F; 2–4C BOX–1R BOX–4 CAD
Seattle, WA	475	98	1–4F 911 CAD
Tampa, FL	300	84	1,2S; 3,4F BOX–R(1981) CAD
Washington, DC	635	693	1–4F 911 BOX–3 CAD
Winnipeg, Manitoba	556	235	1FS; 2S 911 BOX–R(1980) CAD
		TOTAL	25

Computer-Aided Dispatch Systems in Planning

Akron, OH	237	408	1,2C; 3,4F 911 BOX–1 CAD–P
Albuquerque, NM	325	99	1,3F; 2,4C 911 CAD–P
Anne Arundel County, MD	370	440	1–4F CAD–P
Chicago, IL	3200	954	1–4F E911 BOX–1R(1980) BOX–4 CAD–P
Dayton, OH	203	459	1–4F BOX–R CAD–P
Fairfax, VA	19	399	1–4F 911 CAD–P
Fort Worth, TX	400	240	1F; 2–4C BOX–R(1972) CAD–P(1984)
Hamilton, Ontario	306	54	1FS; 2S 911 CAD–P
Mississauga, Ontario	350	117	1FPS; 2S CAD–P(1983)
Montgomery County, MD	579	495	1–4F 911 CAD–P
Philadelphia, PA	1688	130	1–4F 911 BOX–1 CAD–P
St. Paul, MN	287	55	1–4F 911 BOX–R CAD–P(1984)
San Antonio, TX	750	267	1–4S 911 CAD–P
		TOTAL	13

Hazardous Materials Disaster Checklist

Pre-Disaster Period

1. Conduct hazard analysis survey:
    a. Transportation modes
        1. Air
        2. Rail
        3. Water
        4. Pipeline
    b. Fixed facilities
        1. Factories
        2. Bulk storage
        3. Shipping and transfer
2. Conduct a survey of hazardous materials:
    a. Location
    b. Type
    c. Quantity
3. Evaluate resources available for dealing with specific locations and classes (flammable gases, corrosives, etc.) of hazardous materials.
4. Refer to transportation checklist that follows this checklist for suggested surveys of transportation modes.
5. Determine deficiencies in individual department operating procedures.
6. Develop hazardous materials training programs.
7. Develop standard operating procedures for hazardous materials incidents.
8. Establish mutual aid agreements with industries for:
    a. Special fire protection
    b. Suppression agents
    c. Special container patch kits
    d. Technical experts
    e. Spill control and clean-up equipment personnel
9. Develop pre-emergency response plans for potential transportation incidents and fixed facilities. Consider:
    a. Quantity of hazardous materials involved
    b. Health problems
    c. Fire danger
    d. Reactivity with suppression agents
    e. Potential dispersion areas
    f. Life, property, and environmental exposures
    g. Control/shutoff valve locations
    h. Special equipment required

Disaster Period

1. Determine the presence of hazardous materials.
    Consider:
    a. Transportation vehicles
    b. Dumps/waste sites
    c. Construction areas
    d. Fixed facilities
2. Estimate the potential harm to life, property, and the environment.
    Consider:
    a. Container size
    b. Shape
    c. Pressure
    d. Quantity

3. Choose a response objective and consider options. Protect life exposure as necessary. Consider:
    a. Intervention for immediate life-threatening rescue, if required.
    b. Withdrawal from area for identification of material involved and further assessment.
    c. Total withdrawal and evacuation to an estimated safe area.
4. Identify the material involved.
    Look for:
    a. Use levels
        1. Industrial sites (higher concentration potential)
        2. Home use (weaker concentrations.
    b. Containers
        1. Sizes
        2. Shapes
        3. Configurations
    c. Container marking systems
        1. Special color codings
        2. Placards/labels (D.O.T., NFPA 704, United Nations Number)
        3. Stenciled tank identification numbers
        4. Company signs, product names
    d. Documents
        1. Waybill
        2. Consist
        3. Invoices
        4. Supply/stock inventory lists
5. Contact manufacturer, shipper, etc., as required by contacting the Chemical Transportation Emergency Center (CHEMTREC 800-424-9300).
6. Re-evaluate emergency with new information.
7. Monitor progress throughout the incident.

Post-Disaster Period

1. Conduct medical evaluation of personnel as necessary.
2. Evaluate resources, inventory supplies, equipment damage.
3. Criticize emergency operations.
4. Review, revise, and update standard operating procedures and disaster plan mutual aid agreements as required.
5. Implement training program for correcting deficiencies.

Transportation Disaster Checklist

Pre-Disaster Period

1. Conduct hazard analysis by surveying:
    a. Types of transportation in the jurisdiction
        1. Aircraft
        2. Boat/ship
        3. Passenger train
        4. Subway
        5. Bus
    b. Examine transportation routes
        1. Aircraft flight patterns
        2. Aircraft final approach patterns to local airports
        3. Train routes, track locations

        4. Bus travel routes; consider school buses and through traffic
        5. Shipping lanes, barge traffic, canals
    c. Check transportation accident records to determine most frequent accident areas. Consult police department records, Federal Railroad Administration, U.S. Coast Guard Port Commander, Federal Aviation Administration.

2. Establish areas most likely to have a transportation disaster.
3. Examine fire department resources available for responding to a potential transportation disaster.
   Consider:
   a. Triage, emergency medical supplies for mass casualty. Will there be enough to treat 100 to 500 passengers?
   b. Morgue capabilities, body markers, tags, bags
   c. Special extrication equipment
   d. Underwater rescue capabilities
   e. Breathing apparatus capable of subway rescue, e.g., 45 to 60 minutes
   f. Communications for long-term field operation
4. Develop special operations plans as necessary for individual disaster types. Stress command post operations, communications, triage, and mutual aid.

Disaster Period

Implement disaster plan; conduct normal fire and rescue functions and adapt as the situation requires.

1. Establish clearly marked command post.
2. Establish necessary communications links with support agencies.
3. Implement triage, emergency medical operations plan.
4. Establish well-controlled perimeter and restrict unauthorized entry.
5. Preserve evidence for National Transportation Safety Board, U.S. Coast Guard, federal aviation investigators.
6. Hold briefings for the media on a regular basis. Implement a plan for a one-time tour of the accident scene.
7. Establish staging areas for mutual aid companies, helicopters, etc.
8. Maintain good field records, keep track of expenses, overtime, belongings of survivors, body part locations, etc.
9. Implement a body recovery plan for fatalities.
   Consider:
   a. Additional body bags
   b. Markers for body location, personal identification, investigation, morgue location
   c. Temporary morgues, e.g. refrigerated vehicles, closed areas
   d. Insect spray at the accident site during summer months

Post-Disaster Operations

1. Evaluate supply levels and resupply as necessary.
2. Hold a debriefing for fire and rescue personnel. Make psychological counseling available for personnel.
3. Criticize operations and develop recommendations for improvement.

Conflagration Checklist

Pre-Disaster Period

1. Conduct hazard analysis.
   a. Identify potential conflagration areas
   b. Conduct conflagration analysis

    c. Evaluate fire suppression capabilities
    d. Evaluate water supplies, fire flow capabilities
2. Establish mutual aid agreements with:
    a. Fire departments for personnel and apparatus
    b. Railroads for flatcar transportation of apparatus
    c. Water tankers such as tank trucks, cement mixers
    d. Demolition teams
3. Review laws, ordinances for the authority to demolish public property in emergencies.
4. Develop drafting areas at parks, streams, lakes, swimming pools.
5. Participate in long-range planning to eliminate conflagration hazards.
    a. Construct fire breaks
    b. Develop fire codes for preventing conflagration hazards.
6. Develop standard operating procedures for emergency response to conflagration.
7. Survey hose thread sizes and adapt as necessary.

Conflagration Potential Period

During periods of prolonged hot, dry weather with high winds:

1. Implement "no burning" laws.
2. Increase inspections in hazard areas.
3. Use fire patrols in hazard areas.
4. Increase response levels for reported fires in hazard areas.

Conflagration Period

1. Determine fire spread potential.
2. Call for additional resources as required *immediately*.
3. Contact water distribution facilities to increase water supply to affected areas.
4. Evacuate areas well in advance of the fire.
5. Request additional communications equipment as required.
6. Use helicopters for observations.
7. Maintain entry and exit control points.
8. Use natural fire breaks for defense lines well in advance of the fire.

Post-Conflagration Period

1. Inventory resources and restock as necessary.
2. Criticize fire service operations.
3. Review, revise, and update disaster plan and standard operating procedures as required.
4. Participate in fire engineering and code review as required.

Voluntary Organizations Active in Disaster Services and Guidelines for Developing Red Cross and Volunteer Organization Disaster Response Plans

The basic steps involved in working with the Red Cross and other voluntary groups are simple:

1. A written agreement and plan should be worked out which outlines Red Cross and fire department responsibilities and how they complement each other.
2. A system should be developed for notifying the nearest Red Cross chapter when families are in need of help or the fire department needs canteen or other assistance. Where feasible, this could be done through a municipal or county fire dispatch system. Red Cross chapters frequently are located in the county seat; therefore, it may

be desirable for the notification system to include names and phone numbers of Red Cross contact or liaison people who live within each fire department's jurisdiction. Perhaps the best way to initiate such arrangements, if they do not exist already, is through the county emergency service organizations.

3. One person in each department should be designated as an operational liaison to the Red Cross and other voluntary agencies. This could be a designated officer, a fire fighter who is a Red Cross-certified first-aid instructor, and thus, already a Red Cross volunteer or an officer of the auxiliary.
4. If there are specific arrangements made for utilization of fire houses or other department facilities by the Red Cross, the basis on which they are used and who assumes certain costs should be spelled out in writing. Whenever fire department facilities are used or the Red Cross and other voluntary groups work with the fire department or its auxiliary, the cooperative nature of the relief effort should be clearly identified so everyone is aware of it.
5. In planning for larger disasters, arrangements between the fire department and the Red Cross or other groups should be a part of the total community or county plan.

Voluntary Organizations Active in Disaster

American National Red Cross
Robert D. Vessey
National Director
Disaster Services
Washington, DC 20006
202-857-3722

American National Red Cross
Kathy Curry
Deputy Director
Disaster Services
Washington, DC 20006
202-857-3718

Ananda Marga
Ms. Kay Nelson
8700 Manchester Rd. #3
Silver Springs, MD 20901
301-588-6395

Ananda Marga
Universal Relief Team
854 Pearl St.
Denver, CO 80203
303-623-6602

Boy Scouts of America
James C. Langridge
P.O. Box 61030
Dallas/Ft. Worth Airport, TX 7526l
214-659-2447

B'nai B'rith National Headquarters
Seymour C. Cohen
Disaster Relief Commission
1640 Rhode Island Ave., NW
Washington, DC 20036
202-857-6600

B'nai B'rith National Headquarters
Amy E. Lynn
Community Projects Coordinator
1640 Rhode Island Ave., NW
Washington, DC 20036
202-857-6580

Church of the Brethren Disaster Service
H. McKinley Coffman
Brethren Service Center
Box 188
New Windsor, MD 21776
301-635-6464 ext. 45

Church of the Brethren Disaster Service
R. Jan Thompson
Brethren Service Center
Box 188
New Windsor, MD 21776
301-635-6464 ext. 45

Christian Reformed World Relief Committee
C. Neil Molenaar
Director, Domestic Programs
2850 Kalamazoo Ave., SE
Grand Rapids, MI 49508
616-241-1696

Church World Service
John Schauer
Director Material Resources
475 Riverside Dr., Room 630
New York, NY 10027
212-870-2066

Church World Service
W. D. Dibrell
Domestic Disaster Coordinator
Box 188
New Windsor, MD 21776
301-635-6464 ext. 25

The Episcopal Church Center
Rev. Samir J. Habiby
Executive Director
Presiding Bishops Fund for W. R.
815 Second Ave.
New York, NY 10017
212-867-8400

The Episcopal Church Center
Miss Marion Morey
Assistant Director
Presiding Bishops Fund for W.R.
815 Second Ave.
212-867-8400

Goodwill Industries of America
Joseph E. Pouliott
Executive Vice President
9200 Wisconsin Ave., NW
Washington, DC 20014
301-530-6500

Lutheran Council in the U.S.A.
Rev. Richard Rhyne
Domestic Disaster Response
360 Park Ave., S
New York, New York 10010
212-532-6350 office in NYC
919-275-4636 home office

Mennonite Disaster Service
C. Nelson Hostetter
21 S. 12th St.
Akron, PA 17501
717-859-1151 or 2392

National Catholic Disaster Relief Committee
Rev. Msgr. Leo J. Coady, Chairman
Holy Redeemer Rectory
9705 Summit Ave.
Kensington, MD 20795
301-942-2333

National Conference of Catholic Charities
Brother Joseph Berg
Suite 307
1346 Connecticut Ave., NW
Washington, DC 20036
202-785-2757

Presbyterian Church in U.S.
Colleen Shannon-Thornberry
Staff Association National Services
General Assembly Mission Board
341 Ponce DeLeon Ave.
Atlanta, GA 30308
404-873-1531

The Salvation Army National Headquarters
Col. Orval A. Taylor
National Chief Secretary
120 W. 14th St.
New York, NY 10011
212-620-4900

The Salvation Army
Lt. Col. Ernest A. Miller
Director of World Service Office
1025-15th St., NW - 2nd Floor
Washington, DC 20005
202-833-5577

Seventh-Day Adventists General Conference
Perry F. Pedersen
6840 Eastern Ave.
Washington, DC 20012
202-723-0800

Seventh-Day Adventists World Service
Robert Johnson
Potomac Conference
Box 1208, Gaymont Place
Staunton, VA 24401
703-886-0771 or 737-3793

Southern Baptist Convention Home Mission Board
Dr. Paul R. Adkins, Director
Department of Christian Social Ministry
1350 Spring St., NW
Atlanta, GA 30309
404-873-4041

Southern Baptist Convention
Norman Godfrey
Director of Ministries
Brotherhood Commission

1548 Poplar Ave.
Memphis, TN 38104
901-272-2461

Society of St. Vincent De Paul
Dudley Baker
Executive Secretary
Superior Council of the U.S.
4140 Lindell Blvd.
St. Louis, MO 63108
314-371-4980

Society of St. Vincent De Paul
Col. Arthur S. Lawless
Council of the United States
715 Wilmington
Dayton, OH 45420
513-299-3159
Jan. to mid May
110 Riverside Dr.
Saranac Lake, NY 12983
518-891-4701
mid May to January

United Methodist Church Committee on Relief (UMCOR)
Paul T. Morton
Executive Secretary for Special Ministry
Board of Global Ministries
475 Riverside Dr., Room 1470
New York, NY 10027
212-678-6239 or 6290

United Presbyterian Church U.S.A.
William K. DuVal
World Relief, Emergency and Resettlement Service
475 Riverside Dr., Room 1268
New York, NY 10027

Volunteers of America
General John F. McMahon
Commander-In-Chief
340 West 85th St.
New York, NY 10024
212-873-2600

Volunteers of America
Lt. Col. Robert N. Coles
P.O. Box 398
Hagerstown, MD 21740
301-739-4431

Volunteers of America
Col. Ray C. Tremont
Southern Regional Director
433 Metairie Rd.
Metairie, LA 70005
504-837-2652

Source: *Disaster Planning Guidelines for Fire Chiefs*, IAFC/FEMA 1980, Contract DCPA 01-79-C-0303

DISASTER PLANNING GUIDE AVAILABLE

The *San Francisco Corporate Disaster Planning Guide* is a 70-page guide that was written to help employers to develop plans for corporate survival in both natural and man-made disasters. The guide was written by San Francisco business people, public officials, and Red Cross personnel, and published by the Red Cross Disaster Resource Center of the American Red Cross. Contained in the guide are a survey of planning concepts, a prototype plan covering a variety of emergency situations, a directory of resources for equipment and supplies, and a bibliography of pertinent disaster planning publications. The prototype plan includes the assignment of employee responsibilities, evacuation and relocation procedures, earthquake response measures, preparedness and response to fires, and basic first aid.

The guide can be ordered from the Red Cross Disaster Resource Center, 1550 Sutter St., San Francisco, CA 94109 or by calling (415) 776-1500, extension 211. The cost is $10.00 and is a contribution to the Center.

Public Firesafety Education

Firesafety Education Programs

To prevent fires and burns through firesafety education requires more than materials like flyers, films, and posters. Materials are supportive tools used by firesafety educators in presenting a coordinated program of firesafety. Programs may be very broad in scope, embracing an entire town, or they may be narrow, for instance, confined to preschoolers or to a particular segment of the school or adult population.

Any firesafety education program must be the result of initiative and creativity at the local level. The creation of such programs, however, need not occur in the dark. There are several programs of firesafety education distributed nationwide that can be vital components of a local endeavor. In addition, there are already many local programs that can be tapped for suggestions and information.

This section contains two lists. The first describes programs of a national scope, most of them geared to educating children about firesafety. The second describes various local firesafety programs. Most of these are designed for local uses, but the sources should be consulted regarding availability of materials for other programs.

National Firesafety Education Programs

Learn Not To Burn Curriculum

Description: This is a resource workbook for teachers at three elementary school levels: K-2, 3-5, and 6-8. There is a separate edition for each of these three levels. The full-size, 3-ring binder contains much useful background information, teaching tips, and a bibliography, but the core consists of 25 curriculum cards, one for each major firesafety behavior. Each card contains objectives, activity suggestions, and means of integrating the firesafety lessons with other more traditional classroom subjects (math, art, English, social studies, etc.).

Components: Full-size, 3-ring binder containing all printed materials.

Audience: Classroom teachers of K-2, 3-5, and 6-8.

Cost: $29.50 per kit (non-member)
$26.55 per kit (member)

Source:
Public Education Department
National Fire Protection Association
Batterymarch Park
Quincy, MA 02269
(617) 770-3000

Project Burn Prevention (Complete Kit for Children)

Description: Project Burn Prevention consists of three separate units, depending upon the age of the children involved. The kit for ages 4-7 focuses on identifying home hazards, the importance of exit planning, crawling under smoke, and the possible consequences of playing with matches. The kit for ages 7-12 focuses on scald, flame, and burn prevention. It also includes action to take in the event of a house fire and first-aid for burns. The concept and consequences of risk-taking and protecting children from burns are the focal points for the kit for ages 12-18.

Components: Each kit contains appropriate teacher's guide, posters, film, and cassettes.

Source:

National Fire Protection Association
Batterymarch Park
Quincy, MA 02269
(617) 770-3000

Project Burn Prevention (Complete Kit for Adults)

Description: Stresses the significance of the burn problem in America. Discusses how to organize a community burn prevention program and provides case studies involving burn injuries to children.

Components: Leader's guide, game, investigative reports, case studies, and cassettes.

Audience: Adult.

Source:

National Fire Protection Association
Batterymarch Park
Quincy, MA 02269
(617) 770-3000

Firesafety for the Rest of Your Life

(A firesafety teaching program for high school teachers.)

Description: Jointly developed by the Office of Fire Prevention and Control, Department of State of New York, and the Foundation for Fire Safety, this curriculum has been edited and revised by NFPA for nationwide availability. Provides teaching units for twelve firesafety topics, plus basic information, suggestions, and resources for teachers. Emphasizes the importance of firesafety behaviors for adolescents now and for their future as adults.

Components: Full-size, 3-ring binder containing all printed materials.

Audience: Classroom teachers of high school students grades 9-12.

Source:

National Fire Protection Association
Batterymarch Park
Quincy, MA 02269
(617) 770-3000

In Case of Fire

(A Firesafety Program for Mentally Retarded Adults)

Description: This program was developed by the Massachusetts Firefighting Academy together with the Massachusetts Department of Mental Health and pilot-tested in supervised community residences in selected sites across the country. Consists of a Trainer's Guide, Picture Booklet to reinforce lessons, and three slide/tape modules. These are Introductory Lessons and Basic Fire Evacuation and Protection Procedures, Advanced Fire Evacuation Procedures, and Common Household Fire Hazards. Utilizes the "train the trainer" concept to present firesafety information to supervisors, who in turn present the appropriate messages to the mentally retarded adults under their care.

Source:

National Fire Protection Association
Batterymarch Park
Quincy, MA 02269
(617) 770-3000

Junior Fire Marshal Program

Description: There are two editions of this program, one for children in kindergarten and grade 1, and another for students in grades 2 and 3. Centerpiece is a classroom kit entitled "Four Steps to Safety." This focuses on four firesafety behaviors: playing with matches, crawling low in smoke, using stop, drop, and roll, and home firesafety planning.

Components: Basic component is the "Four Steps to Safety" book for students. Additional components: films, filmstrips, teaching manual, coloring posters, calendars, T-shirts, helmets, etc. (available depending upon the sponsor).

Cost: $6.95 per kit ("Four Steps to Safety") plus 10% postage/handling.

Source: The Junior Fire Marshal Program is usually sponsored by a local Hartford Insurance agent. Additional information about the program may be obtained from:

Director, Fire Safety Education
Hartford Insurance Group
Hartford Plaza
Hartford, CT 06115
(203) 547-5000

Burger King Fire Safety Program

Description: Sponsored by the Burger King Corporation, there are four main parts to the program: Snuffy, the talking fire engine, for school programs, mall exhibits, and parades; a 15-minute film, "Snuffy's Fire Brigade"; an education unit; and the Hot Spot House, a four-foot high, 3-dimensional house highlighting firesafety hazards in the home.

Components: The education unit mentioned above is called "Make Time for Fire Safety." It includes large flash cards, duplicating masters, drawing and coloring projects, and a teacher's guide.

Audience: Children in grades K-6.

Cost:

$5.00 per education unit ("Make Time for Fire Safety").
$80.00 per film ("Snuffy's Fire Brigade") (Spanish version available).
$180.00 per "Hot Spot House" kit, slide, and tape show.

Source:

Robert Landau Associates Inc.
Attn: Alison Hendrie
The Chrysler Building
405 Lexington Ave.
New York, NY 10174
(212) 599-1900

The Match is a Tool

Description: A burn prevention methodology developed to assist parents with children who are playing with matches and fire.

Components: Introduction, letter to parents, "Match Is a Tool" brochure, "Control of Fireplay" flyer.

Audience: General.

Source:

Matt Maley
Shriners Burns Institute
202 Goodman St.
Cincinnati, OH 45219
(513) 751-3900

Preschool and Elementary Fire Prevention and Conservation Education Program
Source:

Lou Gunter, Educ. Officer
California Department of Forestry
416 Ninth St.
Sacramento, CA 95814
(916) 445-9920

Sesame Street Fire Safety Program
Description: Funded by the Federal Emergency Management Agency, this program combines the firesafety messages portrayed on Sesame Street through its familiar characters with face-to-face teaching and demonstrations.
Components: Fire Safety Resource Book, containing skits, songs, activities, and teaching suggestions for presenting a half dozen specific firesafety messages to preschoolers.

The Fire Safety Guidelines Book offers concrete information and advice for implementing the Sesame Street Fire Safety Project on a local level.
Audience: Preschoolers from ages 3 through 5.
Source:

Anne Marie Santoro
Fire Project Manager
Community Education Services
Children's Television Workshop
1 Lincoln Plaza
New York, NY 10023
(212) 595-3456

Local Firesafety Education Programs

The following firesafety education programs are listed in "A Guide to Fire Education Resources" published by the Office of the State Fire Marshal in California. Most of these are local programs and it is not clear that these programs are available for use outside their local regions. They are included, however, so that firesafety educators may learn what sorts of programs are being sponsored and have a contact who might provide information about a particular program, its organization, components, and success.

Fire Education Planning

Bilingual/Cultural Program
Description: Designed to develop an awareness of the various cultures found in each community and how to target your public education program to that culture.
Components: Slide/tape, specialized speaker.
Audience: In-service.
Source:

Tom Nyhan, San Francisco F. D.
260 Golden Gate Ave.
San Francisco, CA 94102
(415) 861-8000 Ext. 310

The Media - Them or Us
Description: Designed to teach effective use of the media through the development of cooperation, writing public service announcements, news releases, etc.
Components: Printed material, specialized speaker.
Audience: In-service.
Source:
Tom Nyhan, San Francisco F. D.
260 Golden Gate Ave.
San Francisco, CA 94102
(415) 861-8000 Ext. 310

Life Safety Kit: Smoke Detector Legislation
Description: A kit that contains information and material to put a smoke detector campaign together. Includes smoke detector study data, sample brochures and public service announcements.
Components: Suggested PSA, slides, printed material.
Audience: Public educators.
Source:
Federal Emergency Management Agency
P.O. Box 8181
Washington, DC 20024
(202) 287-0689

Public Education Training

Fire Safety Survey - Residential Training
Description: This manual presents a series of lesson plans designed to teach non-fire service people to conduct firesafety surveys in homes. Manual is accompanied by 300 training slides.
Components: Slides, printed material.
Audience: General.
Source:
Jack Cooper Associates
820 Maple
Edmons, WA 98020
(206) 778-8341

Babysitter Firesafety Programs

Babysitter Safety Program
Description: Representative from the fire and police departments, ambulance personnel and a PG&E spokesman teach exit drills in the home, home security, first-aid and electrical safety.
Components: 40-slide program, specialized speaker.
Audience: Grades 6-8.
Source:
Paul J. Fieber, Merced F. D.
P. O. Box 2068
Merced, CA 95340
(209) 722-8331

Babysitter Clinic

Description: Discusses basics of babysitting using flip charts, slide/tape, and demonstrations. Subjects covered: first aid, child care, baby care, personal safety, firesafety, self values and goals for the babysitter.

Components: Film Communicators slide/tape, "The Babysitter Series: Unit I & II," props, specialized speaker.

Audience: Grades 5-12.

Source:

Birgit Davis, H. B. Fire Department
P. O. Box 180
Huntington Beach, CA 92648
(714) 536-5569

Babysitting Clinic

Description: Designed to develop student's understanding of child care, handling of emergency situations, and first aid. Babysitting Clinic is limited to 40 students.

Components: Film Communicators slide/tape, "Babysitter Series," Film Communicators, "Have a Wonderful Evening."

Audience: Grades 5-12.

Source:

Lynne Michaelis, F.V.F.D.
102000 Slatter Ave.
Fountain Valley, CA 92708
(714) 963-8321 Ext. 284

Heating Firesafety

Warm Up to Wood Safely Media Kit

Description: This kit provides instructions on installation and operation of a wood stove. Includes 4 video Public Service Announcements, 5 radio PSA scripts, brochure master, user's guide, and resource list.

Components: Printed material, audiovisual material, user's guide.

Audience: General.

Source:

Montana/Alberta Fire Inspectors Assn.
2100 16th Ave. S
Great Falls, MT 59405
(406) 761-7885

Mobile Homes

Mobile Home Safety

Description: This program discusses fire hazards in mobile homes with emphasis on smoke detectors, placement, and escape planning.

Components: Film Communicators film, "Mobile Home Fire Safety," printed material, specialized speaker.

Audience: General.

Source:

Birgit Davis, H. B. Fire Department
P. O. Box 180
Huntington Beach, CA 92648
(714) 536-5569

Multi-Level/Highrise Buildings

Hotel Motel Highrise Safety Media Kit
Description: The kit consists of 5 TV Public Service Announcements, 3 radio PSAs, 38 slides, suggested script for slides, and a user's guide.
Components: Audiovisual, printed materials.
Audience: General.
Source:
Bio Med Arts Association Inc.
350 Parnessus Ave., Suite 905
San Francisco, CA 94117
(415) 564-1000

Flammable Liquids

Carmody Hazardous Materials Trainer Kit
Description: Demonstrates properties of flammable liquids. Designed to be used for table top demonstrations on the hazards of flammable liquids.
Components: Varies with kit model ordered.
Audience: General.
Source:
Trinity Corporation
31-C Long Sands Rd.
York, ME 03909
(207) 363-2704

Table Top
Description: A table top demonstration for adults and students that teaches general firesafety and the use and misuse of flammable liquids.
Components: Learning aids, props, specialized speaker.
Audience: Grade 6 to adult.
Source:
Joe Day, L.A. Co. F.D.
P. O. Box 3009
Los Angeles, CA 90051
(213) 267-2465

Firesafety Education Resources

The success of firesafety education efforts depends on the right combination and allocation of resources available. Such resources include planning and educational materials, people, programs, and money.

This section provides tables and lists of available resources and materials on firesafety education. The first table includes firesafety catalogs that provide information on print, film, audiovisual, education materials, etc., of interest to the fire service and educators. The second table includes materials for use in firesafety education — print materials for planning and teaching, audiovisuals for planning and teaching, and print materials for working with the media. The first list includes people and organizations to contact for assistance and information on firesafety education. The second list in this section includes sources for firesafety education funding.

People and Organizations

National Fire Protection Association (NFPA) (see section about NFPA)

Contacts:
Corinne Broderick, Manager, Public Education Programs
Batterymarch Park
Quincy, MA 02269
(617) 770-3000

Learn Not To Burn Regional Representatives

The following representatives provide assistance and information to people in their region about NFPA's Learn Not To Burn Curriculum. (NFPA contact: Public Education Department.)

REGION 1 (NV, CA, HI)
Jan Gratton
469 S. Albertson Ave.
Covina, CA 91723
(213) 331-8792

REGION 2 (AK, MT, ID, OR, WA)
Ron Mehlert
14116 65th Dr., W
Edmonds, WA 98020
(206) 743-1748

REGION 3 (KS, NE, OK, CO, UT, WY)
Hugh Graham
Fire Building
Oklahoma State University
Stillwater, OK 74078
(405) 624-5727

REGION 4 (TX, AZ, NM)
Carol Gross
Phoenix Fire Dept.
620 W. Washington St.
Phoenix, AZ 85003
(602) 262-6002

REGION 5 (NC, SC, GA, FL, AL, LA, AR, TN, MS)
Cathy Lohr
Fire Education Specialist and Rescue Services Division
Dept. of Insurance
Box 26387
Raleigh, NC 27611
(919) 733-2142

REGION 6 (MI, WI, MN, SD, ND, IA)
Craig Herling
Madison Fire Dept.
325 W. Johnson St.
Madison, WI 53703
(608) 266-4420

REGION 7 (KY, OH, IN, IL, MO)
Pat Mieszala
Burn Concerns
4218 N. Pulaski Rd.
Chicago, IL 60641
(312) 283-4112

REGION 8 (MD, VA, WV, PA, DE)
Edi Maletsky, Ed. Coordinator
879 Tryens Rd.
Aston, PA 19014
(215) 459-5710

REGION 9 (CT, NJ, NY)
Bill Porter
William Porter Associates
551 Litchfield Turnpike
Bethany, CT 06525
(203) 393-3706

REGION 10 (MA, RI, NH, ME, VT)
Teresa Smalley
7 Jackson Rd.
Scituate, MA 02066
(617) 545-1664

Fire Education Resource Network (FERN)

The Fire Education Resource Network serves as a resource and communications network for public firesafety educators. Established in 1980 with assistance from the U.S. Fire Administration, FERN today works more informally to provide a communications link among the fire education community. State FERN associations have also been established in some regions. Listed below are contact persons for each region.

REGION 1 (ME, VT, NH, MA, RI, CT)
Gene Singer
4 Bennett Place
Danbury, CT 06810
(203) 744-5249

REGION 2 (NY, NJ, PR, VI)
Harry Bohner
New York State Association of Fire Chiefs
8 Van Buren Dr.
Kinderhook, NY 12106
(518) 758-7631

REGION 3 (PA, DE, MD, DC, VA, WV)
Diane Roche
Fire Education Specialist
Virginia Beach Fire Dept.
3610 South Plaza Trail
Virginia Beach, VA 23452
(804) 486-3377

REGION 4 (NC, SC, GA, FL, AL, MS, TN, KY)
Cathy Lohr
Fire Education Specialist
Fire and Rescue Services Division
Department of Insurance
Box 26387
Raleigh, NC 27611
(919) 733-2142

REGION 5 (MN, WI, IL, IN, MI, OH)
Lonnie Jackson
Inspector
Mount Prospect Fire Dept.
112 E. Northwest Hwy.
Mount Prospect, IL 60056
(312) 392-6000

REGION 6 (NM, TX, OK, AK, LA)
Nancy Trench
Supervisor
Fire Service Training
Oklahoma State University
Stillwater, OK 74074
(405) 624-5727

REGION 7 (MD, IA, NE, KS)
W. Kent Harris
Public Fire Education Specialist
Lee's Summit Fire Dept.
207 South Douglas
Lee's Summit, MO 64063
(816) 251-2300)

REGION 8 (UT, CO, WY, MT, ND, SD)
Larry Johnson
Public Information Officer
Salt Lake City Fire Dept.
159 E. 100 South
Salt Lake City, UT 84111
(801) 530-5106

REGION 9 (HI, CA, NV, AZ)
Larry Marshburn
Fire Protection Specialist
Huntington Beach Fire Dept.
2000 Main Street, Box 190
Huntington Beach, CA 92648
(714) 536-5411

REGION 10 (AL, WA, OR, ID)
Dick Small
8959 SW Barbur Blvd.
Portland, OR 97219
(503) 245-7122

Community Education Services (CES)

Through its national office in New York City and regional offices throughout the country, CES is the center of a network of community organizations, parent groups, schools, and hospitals and other institutions interested in actively employing as educational resources the productions of the Children's Television Workshop.

CES Regional Offices

Contact

Anne Marie Santoro — Project Manager
National Office
Sesame Street Fire Safety Program
Children's Television Workshop
One Lincoln Plaza
New York, NY 10023
(212) 595-3456

Contact	Region
Art Guidry Children's Television Workshop One Lincoln Plaza New York, NY 10023 (212) 595-3456	Eastern: New York, New Jersey, Pennsylvania, Delaware, Washington DC, Maryland, Massachusetts, Connecticut, Rhode Island, Maine, New Hampshire, Vermont
Rob Bright Children's Television Workshop 2712 Millwood Ave. P.O. Drawer "L" Columbia, SC 29250 (803) 758-7854	Appalachia: Virginia, West Virginia, No. Carolina, So. Carolina, Kentucky, Georgia, Florida, Tennessee
Daniel Ventura Children's Television Workshop 14 W. Erie St. Chicago, IL 60610 (312) 642-6703/4	Midwest: Illinois, Indiana, Michigan, Wisconsin, Ohio
Rene Pena Children's Television Workshop 1310 Anex St. - Suite 202 Dallas, TX 75204 (214) 826-5850	Southwest: Texas, New Mexico, Colorado, Oklahoma
Ollye Shirley Children's Television Workshop 2775 Delta Dr. P.O. Box 11220 Jackson, MS 39213 (601) 362-5391/2	South: Mississippi, Alabama, Arkansas, Louisiana
Nina Sazer Children's Television Workshop 318 Lincoln Blvd. Suite 235 Venice, CA 90291 (213) 392-8445	West Coast: California, Nevada, Arizona, Washington, Oregon, Alaska, Hawaii

Government, Commercial, and Service Organization Contacts

Children's Television Workshop
Evelyn Davis, Vice President
One Lincoln Plaza
New York, NY 10023
(212) 595-3456

Disney Educational Media Company
500 S. Buena Vista St.
Burbank, CA 91521
(213) 840-1726 (Call Collect)

Factory Mutual Engineering
1151 Boston-Providence Turnpike
Norwood, MA 02062
(617) 762-4300

Federal Emergency Management Agency
Emergency Management Training Center
National Fire Academy
Emmitsburg, MD 21727
1-800-638-9600

Federal Emergency Management Agency
Washington, DC 20472
(202) 287-0874

Fire Prevention Through Films, Inc.
P.O. Box 11
Newton, MA 02161
(617) 965-4444

Institute for Fire and Burn Education
Suite 667
1377 K St. NW
Washington, DC 20005
(301) 834-8316

Insurance Information Institute
110 William St.
New York, NY 10038
(212) 669-9200

Insurance Information Institute
400 Montgomery St.
San Francisco, CA 94104
(415) 392-3185

International Society of Fire Service Instructors
Public Educators Section
20 Main St.
Ashland, MA 01721
(617) 881-5800

National Fire and Burn Education Association
5202 SE Monroe
Milwaukie, OR 97222
(503) 656-7125

National Fire Protection Association
Batterymarch Park
Quincy, MA 02269
(617) 328-9290

National Institute for Burn Medicine
909 E. Ann St.
Ann Arbor, MI 48104
(313) 769-9000

National Safety Council
444 N. Michigan Ave.
Chicago, IL 60611
(312) 527-4800

Shriners Burns Institute
202 Goodman St.
Cincinnati, OH 45219
(513) 751-3900

Underwriters Laboratories, Inc.
Public Information
333 Pfingsten Rd.
Northbrook, IL 60062
(312) 272-8800

U.S. Consumer Product Safety Commission
1111 18th St., NW
Washington, DC 20207
1-800-638-8333

U.S. Forest Service Cooperative Fire Protection Staff
Smokey Bear Program
P.O. Box 2417
Washington, DC 20013
(202) 235-8160

In addition to these specific organizations and associations, there are various positions and organizations at the state and local levels that can lend information, assistance, and support to firesafety education programs.

At the state level consult:
- State Fire Marshal
- State Fire Commissions
- State Fire Training Schools

At the local level consult:
- Fire Department, including chief, fire prevention officer, and other fire service personnel involved in education
- Hospitals and burn units
- Insurance agents and companies
- Consumer and citizen groups, including neighborhood associations
- Educators and related organizations
- Utilities and banks, industrial and manufacturing concerns
- Home offices of major businesses
- Newspapers, radio stations, television networks, cable television stations
- Boy Scout and Girl Scout troops
- Religious organizations
- Civic organizations (Lions, Kiwanis, Rotary, Jaycees, Civitan, etc.)
- Fraternal associations (Masons, Moose, Elks, etc.)

Financial Resources

Most firesafety education funding comes from money allocated from local taxes for the fire department budget. There are, however, other sources of funding. At the local level, various fundraising activities such as carnivals, bingo, and potluck dinners have provided money for firesafety education. Fundraising drives and donations from local businesses and corporations have also been sources of money for particular projects.

In addition to these efforts at the local level, there are two major financial resources to consider: grants from the Federal Government and grants from private foundations.

The Federal Government

Categories of Assistance

Currently, the Office of Management and Budget (OMB) classifies government financial assistance through 7 types of programs. The following list from the *Catalog of Federal Domestic Assistance* defines each type.

1. **Formula Grants:** Allocations of money to States or their subdivision in accordance with a distribution formula prescribed by law or administrative regulation, for activities of a continuing nature not confined to a specific project.
2. **Project Grants:** The funding, for fixed or known periods, of specific projects or the delivery of specific services or products without liability for damages for failure to perform. Project grants include fellowships, scholarships, research grants, training grants, traineeships, experimental and demonstration grants, evaluation grants, planning grants, technical assistance grants, survey grants, construction grants, and unsolicited contractual agreements.
3. **Direct Payments for Specified Use:** Financial assistance from the Federal Government provided directly to individuals, private firms, and other private institutions to encourage or subsidize a particular activity by conditioning the receipt of the assistance on a particular performance by the recipient. This does not include solicited contracts for the procurement of goods and services for the Federal Government.
4. **Direct Payments with Unrestricted Use:** Financial assistance from the Federal Government provided directly to beneficiaries who satisfy Federal eligibility requirements with no restrictions being imposed on the recipient as to how the money is spent. Included are payments under retirement, pension and compensation programs.
5. **Direct Loans:** Financial assistance provided through the lending of Federal monies for a specific period of time, with a reasonable expectation of repayment. Such loans may or may not require the payment of interest.
6. **Guaranteed/Insured Loans:** Programs in which the Federal Government makes an arrangement to indemnify a lender against part or all of any defaults by those responsible for repayment of loans.
7. **Insurance:** Financial assistance provided to assure reimbursement for losses sustained under specified conditions. Coverage may be provided directly by the Federal Government or through private carriers and may or may not involve the payment of premiums.

The Grant Process

The federal grant process begins officially with the submission of an application for assistance. However, before the application is written, there are preliminary steps that must be taken. These steps are the foundation of the grant application. They should be executed thoroughly and completely.

1. **Define the need.** What is the problem that needs assistance through firesafety education? How specifically can the problem be defined? How specifically can the proposed assistance be defined?

Describing a problem and a proposed solution may not be as easy as it sounds. Careful consideration and work at this stage will certainly avoid problems of explaining what you "meant to say" after the application has been submitted.

The more comprehensive a project is, the more likely it will succeed in obtaining funding. Pilot projects which demonstrate novel or experimental advances or approaches that can be applied nationally also stand a good chance of receiving funding.

Before beginning the most rigorous part of proposal preparation, several phone calls or personal visits may help you determine if there is interest in funding your project by one particular government agency. Personal visits usually result in a more favorable outcome.

2. Determine the type of assistance needed. Be realistic in your proposed budget when applying for financial assistance. If you can show cost sharing, the project's chances of success increase. If strong local commitment is demonstrated, matching assistance is much more likely, regardless of the type of assistance originally requested.

Consult the list of categories of assistance to determine the kind of funding you need.

3. Locate an agency whose mission is to support and stimulate local firesafety education activities such as the one you're proposing. For a detailed listing contact a Federal Information Center local, state, or regional office, a local or regional library, or the *Catalog of Domestic Assistance.*

4. Determine your eligibility, the fire department's and/or the community's. Each program varies in eligibility requirements. Some require matching funds; others require communities to be of a certain size or composition. At this point your list of prospective federal funding sources has narrowed, and you can begin to concentrate on the proposed project.

5. Define the goals and objectives of the firesafety education program. Include a description of the purpose and the potential uses of the results of your program for other fire departments and communities. The more likely that others could replicate your project for similar benefits, the more likely your program will receive funding.

6. Obtain preliminary clearances for submitting a proposal. Often units or sub-units of governments are required by law to submit a proposal first to a state, local, or regional clearinghouse. Proposals are rated, given priorities, and receive clearances. Grants are considered as state income if received by a state agency, and grant monies must go through proper budgetary procedures as would state funds. Check for the possible need to go through a clearinghouse for approval.

7. Gather supporting information necessary for the proposal's acceptance by the agency (or agencies) that you have selected. Contact each grantor agency and establish the information items that must be proved, established, and documented to establish eligibility. Examples include nonprofit status, academic degrees, or other credentials of those who are to work or manage the program, and any licenses that may be required.

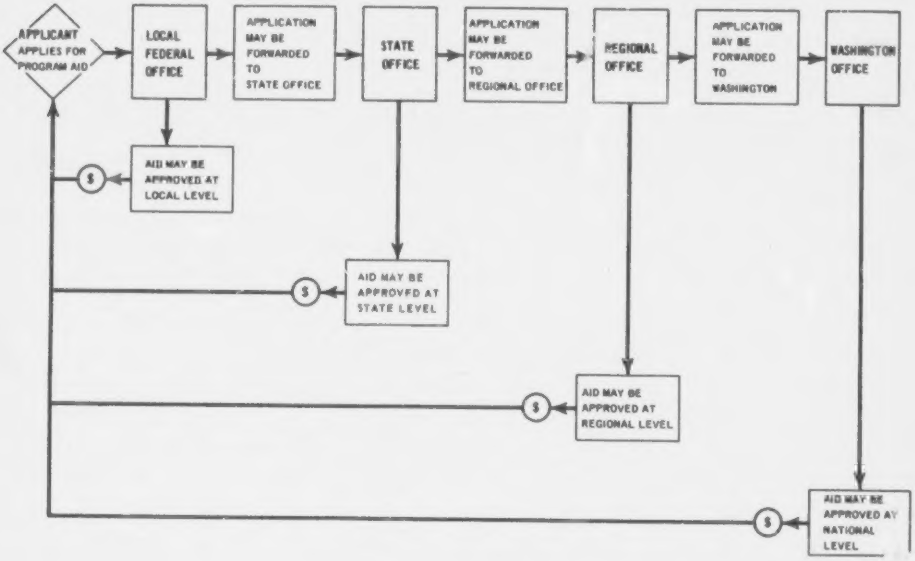
8. Check the timing of your application. It may take a clearinghouse up to 45 days to review your project, and the application procedure (from submission to award) may take one to nine months. Be patient. The federal government is complex, but for the most part, federal employees are sincere and want to help you.

9. Obtain the application forms and submit your proposal. The Federal Standard Form 424 (SF-424) is the typical document that will accompany a proposal. The SF-424 is comprised of about 12 pages of information blanks and items to be filled in by the organization applying for a grant. The SF-424 should precede the proposal and the entire packet should be submitted with a cover letter from the fire chief or city administrative official.

The grantor will review the proposal and the accompanying documentation. You will be advised if additional information is needed. At this point the federal grant process begins and you must wait patiently for notification of award or rejection. (Note: You have a legal right to a written report from a government agency rejecting your proposal.)

The following chart shows submission and approval points.

FEDERAL GRANT APPLICATION AND APPROVAL PROCESS


APPLICANT APPLIES FOR PROGRAM AID
LOCAL FEDERAL OFFICE
APPLICATION MAY BE FORWARDED TO STATE OFFICE
STATE OFFICE
APPLICATION MAY BE FORWARDED TO REGIONAL OFFICE
REGIONAL OFFICE
APPLICATION MAY BE FORWARDED TO WASHINGTON
WASHINGTON OFFICE
AID MAY BE APPROVED AT LOCAL LEVEL
AID MAY BE APPROVED AT STATE LEVEL
AID MAY BE APPROVED AT REGIONAL LEVEL
AID MAY BE APPROVED AT NATIONAL LEVEL
$
$
$
$

It should be remembered that the degree of success of a request for funds will be directly proportional to the "homework" and preparation — the foundation — that go into the proposal, as well as the magnitude of the benefits to be derived. Federal agencies receive many more proposals than they can fund. Projects in higher priority areas (as established by the agency) and judged to have the highest potential for successful results with the greatest benefit will be chosen in preference to others. Each fiscal year brings different levels of funding to each agency. It may be necessary to re-submit proposals from time to time.

The Grant Content

Proposals contain various types of information with varying levels of detail, depending upon the nature of the program. Obtain guidelines from the grantor agency to assist you in determining the content needed. Generally, the proposal should contain the following information:

1. Background. Include the background of the area in which your project will function. For example, if the project is to implement a home firesafety survey program, discuss briefly the residential fire problems.

If the project is for evaluating a juvenile firesetter counseling program, discuss the arson problem nationally. Consider how it affected your community to the point of implementing a counseling program.

2. Problem or Need. This section should contain a description of *what* needs to be done and *why* this proposed action is necessary.

3. Benefits or Results. Here is the part in which you list all the good things that your project will yield. Be specific in describing each benefit and be complete in the list. Don't exaggerate the benefits, either in the degree of benefit or the number of benefits. Results should relate to the community and show how it has improved or how others can implement a similar program (with or without additional government funding).

4. Detailed Description. In No. 2 you described *what* you were going to do. Here you describe *how*. "Detailed" is a relative term. Your project may be described in terms of who and when and where and how to the nth degree. On the other hand, the nature of the project may be to design a specific procedure for a certain firesafety education task. In this latter case your methods should be described in general terms.

As a minimum, indicate that you will submit quarterly reports to the grantor on the progress of the grant and indicate the timing o a Gantt chart (cf. No. 6, below).

5. Budget. In some programs the amount of money available is fixed. Your request cannot exceed the limit. In others, the proposed budget can reflect all costs and expenses necessary for the completion of the project, regardless of the amount.

Several rules, (both written and unwritten), govern the display of a project budget. Typical budget items are:

Personnel — This includes salaries and fees of those paid directly from project funds.

Fringe Benefits — Insurance, retirement, and other benefits are considered in this item. Be sure that the project funds can pay for fringe benefits. These are often considered to be part of the requesting agency's contribution to the project.

Travel — Project staff members may need to travel to other communities in a research phase of the project. Again, be realistic, not extravagant.

Equipment — Normally this item is used to cover the rental expenses of certain equipment used in the performance of the project. For example, if the project involves training, you may need to rent slide projectors, films, or a meeting room. If the project involves writing or researching a firesafety education master plan, filing cabinets, desks, and typewriters may need to be rented. Unless agreed upon by the grantor, this item cannot be used to purchase equipment.

Supplies — Generally, office supplies such as paper, ink, pens, pencils, and the like are budgeted here. Most expendable items are included. Again, check with the grantor to find out what can and cannot be included.

Contractual — This includes any work that will not be performed by your department's staff and must be paid from grant funds. This might cover instructors, data analysts, or consultants with specific expertise relating to the project.

Other — These expenses should cover items not already covered in the other categories, such as production of special materials or the use of certain facilities.

These budget items are considered to be "Direct Charges." That is, they are necessary for the direct performance of the grant.

A second category that needs consideration is "Indirect Charges." These are costs incurred by you for the administration of the grant. Such costs might include a percentage of personnel time to process checks (payroll, payments, etc.), a percentage of the costs to support the office (overhead: electricity, rent, lighting) and other similar costs. In other words, there is additional expense to administer the project and its funds. If it takes an additional 5 percent of a city accountant's time to process the grant funds, 5 percent of the accountant's salary may be charged against the grant funds.

6. Time of Performance. Indicate in the Detailed Description No. 4 at what point in time major activities occur. These times should be displayed graphically. The following Gantt chart is offered as an example.

Notice that the left-hand column lists major tasks associated with the program. The right-hand section shows month by month when these tasks begin and end. The months are generally indicated by 1, 2, 3... instead of their names. The numbers indicate the approximate month of the activity *after* the award date of the grant. For instance, if the grant is awarded in September and the first major activity is in October, month 1 would be October. Each date is an estimate, but that estimate should reflect a workable schedule for the staff involved.

The above are suggested items to be included in any proposal to obtain a grant of financial assistance from a federal agency. There may be additional special information required by the grantor. Extra help and information on preparing proposals are available from a variety of local or nearby sources. Once you've completed several proposals, the format and procedures will become easier and seem less complicated.

TASKS	DESCRIPTION	MONTH 1	2	3	4	5	6	7	8	9	10
1	Appoint Advisory Committee		▲								
2	Gather data on fire incidents	○ - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	▲	
3	Gather data on fire inspection	○ - -	- - -	- - -	▲						
4	Gather data on community development		○ - -	- - -	- - -	- - -	▲				
5	Advisory Committee meetings		▲		▲		▲		▲		▲
6	Develop fire inspection plan			○ - -	▲						
7	Develop fire inspection guidelines					○ - -	▲				
8	Field test guidelines						○ - -	▲			
9	Analyze test data								○ - -	▲	
10	Submit quarterly reports			▲			▲			▲	
11	Submit final report										▲

Comments: Costs:

Approval: Title: Date:

Start ○ End ▲

Federal Information Centers

Information on programs of interest may be obtained from a regionally-based Federal Information Center (FIC). The FIC staff can help you locate the closest and/or most appropriate federal agency that handles the program areas of interest to you. These Centers are operated by the U.S. General Services Administration.

You may contact a Center by phone, personal visit, or letter. Each Center is a focal point of information about the federal government. When you are seeking information, the Center will either provide you with the answer you need or direct you to an agency representative who can help you.

There are currently 40 cities with an FIC and an additional 43 cities connected to the nearest Center by telephone tieline. Statewide toll free 800 service is available to the residents of five states: Florida, Iowa, Kansas, Missouri, and Nebraska. The FIC addresses and telephone numbers are listed below.

Alabama
Birmingham
322-8591 Toll-free tieline to Atlanta, GA
Mobile
438-1421 Toll-free tieline to New Orleans, LA

Alaska
Federal Building and U.S. Courthouse
701 C St.
Anchorage 99513
(907) 271-3650

Arizona
Federal Building
230 N. 1st Ave.
Phoenix 85025
(602) 261-3313

Tucson
622-1522 Toll-free tieline to Phoenix

Arkansas
Little Rock
378-6177 Toll-free tieline to Memphis

California
Federal Building
300 N. Los Angeles St.
Los Angeles 90012
(213) 688-3800

Federal Building and U.S. Courthouse
650 Capitol Mall
Sacramento 95814
(916) 440-3344

Federal Building
880 Front St.
Room 1S11
San Diego 92188
(714) 293-6030

Federal Building and U.S. Courthouse
450 Golden Gate Ave.
P.O. Box 36082
San Francisco 94102
(415) 556-6600

TTY (415) 556-3323
San Jose
275-7422 Toll-free tieline to San Francisco

Santa Ana
836-2386 Toll-free tieline to Los Angeles

Colorado
Colorado Springs
471-9491 Toll-free tieline to Denver

Federal Building
1961 Stout St.
Denver 80294
(303) 837-3602

Pueblo
544-9523 Toll-free tieline to Denver

Connecticut
Hartford
527-2617 Toll-free tieline to New York City

New Haven
624-4720 Toll-free tieline to New York City

Washington, DC
7th & D Sts., SW
Room 5716
(202) 755-8660

Florida
Fort Lauderdale
522-8531 Toll-free tieline to Miami

Jacksonville
354-4756 Toll-free tieline to St. Petersburg

Federal Bldg.
51 S.W. 1st Ave.
Miami 33130
(305) 350-4155

Orlando
422-1800 Toll-free tieline to St. Petersburg

William C. Cramer
Federal Building
144 1st Ave., S
St. Petersburg 33701
(813) 893-3495

Tampa
229-7911 Toll-free tieline to St. Petersburg

West Palm Beach
833-7566 Toll-free tieline to Miami

Northern Florida
(Sarasota, Manatee, Polk, Osceola, Orange, Seminole, and Volusia counties and north)
(800) 282-8556 Toll-free line to St. Petersburg

Southern Florida
(Charlotte, De Sota, Hardee, Highlands, Okeechobee, Indian River, and Brevard Counties and south)
(800) 432-6668 Toll-free line to Miami

Georgia
Federal Building and U.S. Courthouse
75 Spring St., SW
Atlanta 30303
(404) 221-6891

Hawaii
P.O. Box 50091
Federal Building
300 Ala Moana Blvd.
Honolulu 96850
(808) 546-8620

Illinois
Everett McKinley Dirksen Bldg.
Room 250
219 S. Dearborn St.
Chicago 60604
(312) 353-4242

Indiana
Gary/Hammond
883-4110 Toll-free tieline to Indianapolis
Federal Building
575 N. Pennsylvania St.
Indianapolis 46204
(317) 269-7373

Iowa
Federal Building
210 Walnut St.
Des Moines 50309
(515) 284-4448

Other Iowa Locations:
(800) 532-1556 Toll-free to Des Moines

Kansas
Federal Building and U.S. Courthouse
444 S.E. Quincy
Topeka 66683
(913) 295-2866

Other Kansas Locations:
(800) 432-2934 Toll-free line to Topeka

Kentucky
Federal Building
600 Federal Place
Louisville 40202
(502) 582-6261

Louisiana
U.S. Custom House
423 Canal St.
Room 100
New Orleans 70130
(504) 589-6696

Maryland
Federal Building
31 Hopkins Plaza
Baltimore 21201
(301) 962-4980

Massachusetts
John F. Kennedy Federal Building
Cambridge St.
Room E-121
Boston 02203
(617) 223-7121

Michigan
McNamara Federal Building
477 Michigan Ave.
Room 103
Detroit 48226
(313) 226-7016

Grand Rapids
451-2628 Toll-free tieline to Detroit

Minnesota
Federal Building and U.S. Courthouse
110 S. 4th St.
Minneapolis 55401
(612) 349-5333

Missouri
Federal Building
601 E. 12th St.
Kansas City 64106
(816) 374-2466

Federal Building
1520 Market St.
St. Louis 63103
(314) 425-4106

Other Missouri Locations: within area code 314:
(800) 392-7711 Toll-free tieline to St. Louis

Other Missouri Locations within area codes 816 and 417:
(800) 892-5808 Toll-free tieline to Kansas City

Nebraska
U.S. Post Office and Courthouse
2[illegible] N. 17th St.
Omaha 68102
(402) 221-3353

Other Nebraska Locations:
(800) 642-8383 Toll-free line to Omaha

New Jersey
Federal Building
970 Broad St.
Newark 07102
(201) 645-3600

Paterson/Passaic
532-0717 Toll-free tieline to Newark

Trenton
396-4400 Toll-free tieline to Newark

New Mexico
Federal Building and U.S. Courthouse
500 Gold Ave., SW
Albuquerque 87102
(505) 766-3091

Santa Fe
983-7743 Toll-free tieline to Albuquerque

New York
Albany
463-4421 Toll-free tieline to New York City

Federal Building
111 W. Huron St.
Buffalo 14202
(716) 846-4010

Federal Building
26 Federal Plaza
Room 1-114
New York 10278
(212) 264-4464

Rochester
546-5075 Toll-free tieline to Buffalo

Syracuse
476-8545 Toll-free tieline to Buffalo

North Carolina
Charlotte
376-3600 Toll-free tieline to Atlanta

Ohio
Akron
375-5638 Toll-free tieline to Cleveland

Federal Building
550 Main St.
Cincinnati 45202
(513) 684-2801

Federal Building
1240 E. Ninth St.
Cleveland 44199
(216) 522-4040

Columbus
221-1014 Toll-free tieline to Cincinnati

Dayton
223-7377 Toll-free tieline to Cincinnati

Toledo
241-3223 Toll-free tieline to Cleveland

Oklahoma
U.S. Post Office and Courthouse
201 N.W. 3rd St.
Oklahoma City 73102
(405) 231-4868

Tulsa
584-4193 Toll-free tieline to Oklahoma City

Oregon
Federal Building
1220 S.W. 3rd Ave.
Room 109
Portland 97204
(503) 221-2222

Pennsylvania
Allentown/Bethlehem
821-7785 Toll-free tieline to Philadelphia

Federal Building
600 Arch St.
Philadelphia 19106
(215) 597-7042

Federal Building
1000 Liberty Ave.
Pittsburgh 15222
(412) 644-3456

Scranton
346-7081 Toll-free tieline to Philadelphia

Rhode Island
Providence
331-5565 Toll-free tieline to Boston

Tennessee
Chattanooga
265-8231 Toll-free tieline to Memphis

Clifford Davis Federal Building
167 N. Main St.
Memphis 38103
(901) 521-3285

Nashville
242-5056 Toll-free tieline to Memphis

Texas
Austin
472-5494 Toll-free tieline to Houston

Dallas
767-8585 Toll-free tieline to Fort Worth

Lanham Federal Building
819 Taylor St.
Fort Worth 76102
(817) 334-3624

Federal Building and U.S. Courthouse
515 Rusk Ave.
Houston 77002
(713) 226-5711

San Antonio
224-4471 Toll-free tieline to Houston

Utah
Ogden
399-1347 Toll-free tieline to Salt Lake City

Federal Building
125 S. State St.
Room 1205
Salt Lake City 84138
(801) 524-5353

Virginia
Newport News
(804) 244-0480 Toll-free tieline to Norfolk

Federal Building
200 Granby Mall
Room 120
Norfolk 23510
(804) 441-3101

Richmond
643-4928 Toll-free tieline to Norfolk

Roanoke
982-8591 Toll-free tieline to Norfolk

Washington
Federal Building
915 Second Ave.
Seattle 98174
(206) 442-0570

Tacoma
383-5230 Toll-free tieline to Seattle

Wisconsin
Milwaukee
271-2273 Toll-free tieline to Chicago

Catalog of Federal Domestic Assistance

A complete listing of all federal assistance programs and additional information about writing proposals can be found in the *Catalog of Federal Domestic Assistance*. The *Catalog* covers all federal funding programs. However, it takes a *knowledge* of local conditions and *imagination* to be able to select those programs which are appropriate to local conditions.

The *Catalog* is published annually, using the most current data available on the status of programs at the time the information is compiled. The basis edition of the *Catalog*, which is usually published in May, reflects completed congressional action on program legislation. A *Catalog* update is published in December and reflects completed congressional action on the President's budget proposals and on substantive legislation as of the date of the compilation. The update must be retained and used along with the basic edition in order to obtain the most current information on program revisions.

The *Catalog* is available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. The cost is $20.00 each. If you live in or near a major U.S. city, there may be a U.S. Government bookstore there which could supply a copy for the regular price. Consult the U.S. Government listings in your telephone directory.

Federal Financial Assistance for Volunteers

The federal agency action has several categories of funding programs which rely on volunteer assistance. These might be of special interest to a firesafety educator planning a large-scale program.

Mini-Grant Program — Grants to provide small amounts of money to local, public, and private nonprofit organizations for the purpose of mobilizing volunteers to work on human, social, and environmental needs, especially those related to poverty.

State Office of Voluntary Citizen Participation — Grants to states to establish or strengthen offices for volunteer services and to improve opportunities for volunteer efforts concerned with human, social, and environmental needs.

Special Volunteer Programs — Provides grants to states to establish and/or strengthen services for human, social, and environmental needs. Provides money to local organizations to mobilize volunteers to work on these needs, especially poverty. Encourages people from all walks of life and from all age groups to perform constructive volunteer service and to encourage wider volunteer participation.

Private Foundations

According to The Foundation Center (see the section on The Foundation Center which follows), a foundation is a "nongovernmental, nonprofit organization, with funds (usually from a single source, either an individual, a family, or a corporation) and program managed by its own trustees, or directors, established to maintain or aid social, educational, charitable, religious, or other activities serving the common welfare, primarily through the making of grants." (From *The Foundation Directory*, 7th edition, Marianna O. Lewis, ed., The Foundation Center, 1979, p. xii.)

According to the Center, there are some 20,000 such foundations, most of them local, and most of them giving a number of small grants for various purposes. Some of these purposes are general, while others are specific and restrictive.

One's ultimate approach to a private foundation is through a written proposal, and, as was mentioned in the section on federal grants, the preparation is the crucial phase.

One should not consider lightly the decision to approach private foundations as a source of money. This is not because foundations are cold, severe organizations trying to hold onto their funds, but because approaching foundations requires a commitment to expending a great deal of time and energy in order to maximize one's chances of success. The competition for the funds of private foundations is as severe as the competition for federal funds. Success depends on understanding the process of grantsmanship and being able to forge a solid proposal.

Volumes have been written on how to use private foundations for funding programs. Since it would be impossible to capsulize all that has been written, it is more practical to list and describe some of the major reference works and resources available. There are no foundations devoted exclusively to providing funds for fire protection or firesafety education. However, since fire does not seem to be a normal category for consideration, a great many foundations do provide funds for education and community development, as well as for social health and welfare. Private foundations stand as a solid financial resource for a firesafety education coordinator to consider.

The Foundation Center

In 1956, the Foundation Center was incorporated by the Board of Regents of the University of the State of New York as an educational institution. Through research, publication and libraries, the Center gathers and distributes information nationally on charitable foundations for public use. If you are considering private foundations as a funding source or if you have already decided to tap them for grants, The Foundation Center publications will give you background information and advice.

The Foundation Directory

Published by the Foundation Center, this standard reference directory contains the most up-to-date information available about nongovernmental, grant-making foundations in the U.S. Approximately 3,000 foundations (qualified by definition and size of assets or aggregrate annual giving) are included. Most entries are based on recent fiscal reports. The most current directory available is the 8th edition. Most libraries have a copy of *The Foundation Directory* in their collection of reference books.

The Foundation Grants Index

Published yearly by The Foundation Center, this book contains descriptions of recently awarded grants that reflect interests of the reporting foundations.

Other Services and Publications of The Foundation Center

Other services and publications of The Foundation Center are listed in the introduction to *The Foundation Directory*. Publications are available at the libraries listed below; also check your local library.

Several other publications are:
About Foundations: How to Find the Facts You Need to Get a Grant
by Carol M. Kurzig
What Makes a Good Proposal?
by F. Lee Jacquette and Barbara L. Jacquette
What Will a Foundation Look for When You Submit a Grant Proposal?
by Robert A. Mayer

Reference Collections Operated by The Foundation Center

The Foundation Center
888 Seventh Ave.
New York, NY 10019
(212) 975-1120

The Foundation Center
1001 Connecticut Ave., NW
Washington, DC 20036
(202) 331-1400

The Foundation Center
Kent H. Smith Library
739 National City Bank Building
Cleveland, OH 44114
(216) 861-1933

(Covers Illinois, Indiana, Kentucky, Michigan, Missouri, Ohio, Pennsylvania, and Wisconsin)

The Foundation Center
312 Sutter St.
San Francisco, CA 94108
(415) 397-0902
(Covers Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming)

Cooperating Collections with Foundation Center Materials

Alabama
Birmingham Public Library
2020 Park Place
Birmingham 35203
(205) 254-2541

Auburn University at Montgomery Library
Montgomery 36117
(205) 279-9110

Alaska
University of Alaska, Anchorage Library
3211 Providence Dr.
Anchorage 99504
(907) 263-1848

Arizona
Tucson Public Library
Main Library
200 S. Sixth Ave.
Tucson 85701
(602) 791-4393

Arkansas
Westark Community College Library
Grand Ave. at Waldron Rd.
Fort Smith 72913
(501) 785-4241

Little Rock Public Library
Reference Dept.
700 Louisiana St.
Little Rock 72201
(501) 374-7546

California
Edward L. Doheny Memorial Library
University of Southern California
Los Angeles 90007
(213) 741-2540

San Diego Public Library
820 E St.
San Diego 92101
(714) 236-5816

Colorado
Denver Public Library
Sociology Division
1357 Broadway
Denver 80203
(303) 573-5152

Connecticut
Hartford Public Library
Reference Dept.
500 Main St.
Hartford 06103
(203) 525-9121

Delaware
Hugh Morris Library
University of Delaware
Newark 19711
(302) 738-2965

Florida
Jacksonville Public Library
Business, Science, and Industry Department
122 N. Ocean St.
Jacksonville 32202
(904) 633-3926

Miami-Dade Public Library
Florida Collection
One Biscayne Blvd.
Miami 33132
(305) 579-5001

Georgia
Atlanta Public Library
10 Pryor St., SW
Atlanta 30303
(404) 688-4636
(Also covers Alabama, Florida, South Carolina, and Tennessee)

Hawaii
Thomas Hale Hamilton Library
University of Hawaii
Humanities and Social Sciences Division
2550 The Mall
Honolulu 96822
(808) 948-8568

Idaho
Caldwell Public Library
1010 Dearborn St.
Caldwell 83605
(208) 459-3242

Illinois
Donors Forum of Chicago
208 LaSalle St.
Chicago 60604
(312) 726-4882
(Also covers Indiana, Michigan, Minnesota, Missouri, Ohio, and Wisconsin)

Sangamon State University Library
Shepherd Rd.
Springfield 62708
(217) 786-6633

Indiana
Indianapolis - Marion County Public Library
40 St. Clair St.
Indianapolis 46204
(317) 635-5662

Iowa
Public Library of Des Moines
100 Locust St.
Des Moines 50309
(515) 283-4259

Kansas
Topeka Public Library
Adult Services Dept.
1515 Tenth St.
Topeka 66604
(913) 233-2040

Kentucky
Louisville Free Public Library
Fourth and York Sts.
Louisville 40203
(502) 584-4154

Louisiana
New Orleans Public Library
Business and Science Division
219 Loyola Ave.
New Orleans 70140
(504) 586-4919

Maine
University of Southern Maine Center for Research and Advanced Study
246 Deering Ave.
Portland 04102
(207) 780-4411

Maryland
Enoch Pratt Free Library
Social Science and History Dept.
400 Cathedral St.
Baltimore 21201
(301) 396-5320

Massachusetts
Associated Foundations of Greater Boston
294 Washington St., Suite 501
Boston 02108
(617) 426-2608

Boston Public Library
Copley Square
Boston 02117
(617) 536-5400

Michigan
Henry Ford Centennial Library
15301 Michigan Ave.
Dearborn 48126
(313) 271-1000

Purdy Library
Wayne State University
Detroit 48202
(313) 577-4040

Michigan State University Libraries
Reference Library
East Lansing 48824
(517) 353-8816

University of Michigan - Flint
UM - F Library
Reference Dept.
Flint 48503
(313) 762-3408

Grand Rapids Public Library
Sociology and Education Dept.
Library Plaza
Grand Rapids 49502
(616) 456-4411

Minnesota
Minneapolis Public Library
Sociology Dept.
300 Nicollet Mall
Minneapolis 55401
(612) 372-6555
(Also covers North Dakota and South Dakota)

Mississippi
Jackson Metropolitan Library
301 State St.
Jackson 39201
(601) 352-3677

Missouri
Clearinghouse for Midcontinent Foundations
University of Missouri, Kansas City
School of Education Building
52nd St. and Holmes

Kansas City 64110
(816) 276-1176
(Also covers Kansas)

Kansas City Public Library
311 E. 12th St.
Kansas City 64106
(816) 221-2685
(Also covers Kansas)

The Danforth Foundation Library
222 S. Central Ave.
St. Louis 63105
(314) 862-6200

Springfield - Greene County Library
397 E. Central St.
Springfield 65801
(417) 869-4621

Montana
Eastern Montana College Library
Reference Dept.
Billings 59101
(406) 657-2320

Nebraska
W. Dale Clark Library
Social Sciences Dept.
215 S. 15th St.
Omaha 68102
(402) 444-4822

Nevada
Clark County Library
1401 E. Flamingo Rd.
Las Vegas 89109
(702) 733-7810

Washoe County Library
301 S. Center St.
Reno 89505
(702) 785-4190

New Hampshire
The New Hampshire Charitable Fund
One South St.
P.O. Box 1335
Concord 03301
(603) 225-6641

New Jersey
New Jersey State Library
Governmental Reference
185 W. State St.
P.O. Box 1898
Trenton 08625
(609) 292-6220

New Mexico
New Mexico State Library
300 Don Gaspar St.
Santa Fe 87501
(505) 827-2033

New York
New York State Library
Cultural Education Center
Humanities Section, 6th Floor
Empire State Plaza
Albany 12230
(518) 474-7645

Buffalo and Erie County Public Library
Lafayette Square
Buffalo 14203
(716) 856-7525

Levittown Public Library
Reference Dept.
One Bluegrass Lane
Levittown 11756
(516) 731-5728

Plattsburgh Public Library
Reference Dept.
15 Oak St.
Plattsburgh 12901
(518) 563-0921

Rochester Public Library
Business and Social Sciences Division
115 South Ave.
Rochester 14604
(716) 428-7328

Onondaga County Public Library
335 Montgomery St.
Syracuse 13202
(315) 473-4491

North Carolina
North Carolina State Library
109 E. Jones St.
Raleigh 27611
(919) 733-3270

The Winston-Salem Foundation
229 First Union National Bank Building
Winston-Salem 27101
(919) 725-2382

North Dakota
The Library
North Dakota State University
Fargo 58105
(701) 237-8876

Ohio
The Public Library of Cincinnati and Hamilton County
Education Dept.
800 Vine St.
Cincinnati 45202
(513) 369-6940
(Also covers Indiana and Kentucky)

Oklahoma
Oklahoma City Community Foundation
1300 N. Broadway
Oklahoma City 73103
(405) 235-5621

Tulsa City-County Library System
400 Civic Center
Tulsa 74103
(918) 581-5144

Oregon
Library Association of Portland
Education and Documents Room
801 SW Tenth Ave.
Portland 97205
(503) 223-7201

Pennsylvania
The Free Library of Philadelphia
Logan Square
Philadelphia 19103
(215) 686-5423
(Also covers Delaware)

Hillman Library
University of Pittsburgh
Pittsburgh 15260
(412) 624-4528

Rhode Island
Providence Public Library
Reference Dept.
150 Empire St.
Providence 02903
(401) 521-7722

South Carolina
South Carolina State Library
Reader Services Dept.
1500 Senate St.
Columbia 29211
(803) 758-3181

South Dakota
South Dakota State Library
State Library Building
322 Fort St.
Pierre 57501
(605) 773-3131

Tennessee
Memphis Public Library
1850 Peabody Ave.
Memphis 38104
(901) 528-2957

Texas
The Hogg Foundation for Mental Health
The University of Texas
Austin 78712
(512) 471-5041

Dallas Public Library
History and Social Sciences Division
1954 Commerce St.
Dallas 75201
(214) 748-9071

El Paso Community Foundation
El Paso National Bank Building,
Suite 1616
El Paso 79901
(915) 533-4020

Funding Information Library
Minnie Stevens Piper Foundation
201 N. St. Mary's St., Suite 100
San Antonio 78205
(512) 277-8119

Utah
Salt Lake City Public Library
Information and Adult Services
209 E. Fifth St.
Salt Lake City 84111
(801) 363-5733
(Also covers Idaho, Nevada, and Wyoming)

Vermont
State of Vermont Department of Libraries
Reference Services Unit
111 State St.
Montpelier 05602
(802) 828-3261

Virginia
Richmond Public Library
Business, Science, and Technology Dept.
101 E. Franklin St.
Richmond 23219
(804) 780-8223

Washington
Seattle Public Library
1000 Fourth Ave.
Seattle 98104
(206) 625-4881

Spokane Public Library
Reference Dept.
West 906 Main Ave.
Spokane 99201
(509) 838-3361

West Virginia
Kanawha County Public Library
123 Capitol St.
Charleston 25301
(304) 343-4646

Wisconsin
Marquette University Memorial Library
1415 W. Wisconsin Ave.
Milwaukee 53233
(414) 224-1515
(Also covers Illinois, Michigan,
and Minnesota)

Wyoming
Laramie County Community College
Library
1400 E. College Dr.
Cheyenne 82001
(307) 634-5853

Puerto Rico
Consumer Education and Service Center
Department of Consumer Affairs
Minillas Central Government Building
North
Santurce 00908

Mexico
Biblioteca Benjamin Franklin
Londres 16
Mexico City 6, D.F.

Public Management Institute

Located in San Francisco, the Public Management Institute publishes two major works dealing with fundraising strategies. These are:

The New Grants Planner: A Systems Approach to Grantsmanship
by Daniel Lynn Conrad and the Research and Development Staff
of the Public Management Institute

This is a comprehensive, methodical guide for the person and/or organization that wishes to pursue private and public sources of grants. Included is a systems approach to preparation and submitting of grants, forms and worksheets, vital grants data, and a bibliography. It is bound in a large, 3-ring binder. Cost is $47.50.

Successful Fundraising Techniques

This second PMI publication covers a variety of fundraising techniques, including direct mail, solicitation of major gifts, grants from public and private sources, and other means. This is a full-size book for the person and/or organization that wishes to secure funds through a variety of fundraising techniques in addition to or in place of grants. Cost of this volume is $37.50.

Both of these books are available from:
Public Management Institute
358 Brannen St.
San Francisco, CA 94107
(415) 896-1900

Annual Register of Grant Support, 1983-1984, 17th edition

Published by Marquis Academic Media, this reference work gives valuable information about public and private grants. Primary divisions of information are by category of interest, e.g., Special Populations, Urban and Regional Affairs, Education, and so on. Within each division grant sources (public and private) are listed alphabetically. The information given about each source generally includes the year founded, names of programs, types of grants, year program started, purpose, eligibility, financial data, number of awards per year, application information, officers, and address for inquiries.

Check your local library or a local college library.

Publisher's Address:
Marquis Academic Media
Marquis Who's Who, Inc.
200 E. Ohio St.
Chicago, IL 60611
(312) 787-2008

FIRESAFETY EDUCATION CATALOGS

Source	Catalog Title	Description	Audience
Office of the State Fire Marshal (Hugh Council) 7171 Bowling Drive Suite 600 Sacramento, CA 95823 (916) 427-4166	Fire Education Resources	thorough summary of materials (print, film, slides), people and programs; well organized; updated periodically	fire prevention officers and firesafety educators
National Fire Protection Association (NFPA) Publications Department Batterymarch Park Quincy, MA 02269 (617) 770-3500	Firesafety Educational Materials	education materials; posters, flyers, firesafety programs, films, books pictured and described	
	Firesafety Films and Audiovisuals	contains brief descriptions of NFPA films and slide-tapes; sections on community awareness and firesafety for children and general public included	
	Fire Prevention Week Catalog	spotlight of NFPA's materials relevent to Fire Prevention Week; theme for year; published yearly	fire prevention officers and firesafety educators
	Health Care Catalog	description of firesafety training and educational materials for use in health care facilities	fire prevention officers, firesafety educators, health care training personnel
	Business and Industry	description of firesafety materials for use in business and industry	fire prevention officers, firesafety educators and personnel in business environments
Shriners Burns Institute (Matt Maley) 202 Goodman St. Cincinnati, OH 45219 (513) 751-3900	Print Materials List	list of available pamphlets related to fire, prevention and burns	firesafety educators and fire prevention officers
	Resource Materials List	list of films and other materials available on a loan basis	

Federal Emergency Management Agency (FEMA) P.O. Box 8181 Washington, DC 20024 (202) 287-0689	FEMA #20	publications of the Federal Emergency Management Agency; includes materials on fire, arson, and firesafety education	fire prevention officers and firesafety educators
National Safety Council P.O. Box 11933 Chicago, IL 60611 (312) 527-4800 1-800-621-8051 (TOLL FREE "Hot Line" for ordering. Not usable in IL.)	General Materials Catalog	print, film, and audiovisual materials from the National Safety Council; one page focus on industrial firesafety	fire prevention officers, firesafety educators, and safety personnel working in industrial settings
Channing L. Bete Co., Inc. 200 State Rd. Deerfield, MA 01373	Catalog of Scriptographic Booklets	illustrated booklets on public safety topics; section on firesafety included	fire prevention officers, firesafety educators, teachers

FIRESAFETY EDUCATION MATERIALS

Source	Title	Description
		Print materials for planning
National Fire Protection Association (NFPA) Batterymarch Park Quincy, MA 02269 (617) 770-3500	Fire Protection Handbook	15th ed., Sec. 1, Introduction to Fire Protection and Fire Prevention
	Firesafety Educator's Handbook	manual of strategies and ideas for firesafety educators, teachers, community leaders, and others responsible for planning fire prevention and protection
Federal Emergency Management Agency (FEMA) P.O. Box 8181 Washington, DC 20024 (202) 287-0689	Master Planning: Report To Congress	
	Fire and Emergency Master Planning — A Selected Bibliography	
	Multi-Jurisdictional Fire Protection Planning	
	Public Fire Education Planning Process — A Five Step Process	
	Fire Education Planning	
	Teaching Fire Safety Education	
International Fire Service Training Association (IFSTA) Customer Services — Fire Protection Publications Oklahoma State University Stillwater, OK 74074 (405) 624-5723	Public Fire Education IFSTA 606	manual for designing and implementing firesafety education programs
Consumer Product Safety Commission (CPSC) 5401 Westbard Ave. Bethesda, MD 20207 (301) 492-6800	Strategy Manual	manual for conducting fire prevention and safety education programs for low-income minorities

		Audiovisual materials for planning
NFPA	Reaching the Public: Unit 1 The Fire Service Role Reaching the Public: Unit 2 Techniques and Strategies	each unit consists of an 80-slide/tape program for in-service training of fire safety educators
IFSTA	Public Fire Education Specialist	77-slide/tape program explains some community fire protection and education problems and offers strategies as solutions
		Print materials for teaching
Shriners Burn Institute (Matt Maley) 202 Goodman St. Cincinnati, OH 45219 (513) 751-3900	Firesafety Education Within the Content of the Curriculum	focus on integrating firesafety information with specific classroom subjects
	The Fire and Burn Problem	paper on importance of public education as a tool for reducing fire-related death and injury
Children's Television Workshop (Anne Marie Santoro, Fire Project Manager, Community Education Services) 1 Lincoln Plaza New York, NY 10023 (212) 595-3456	Firesafety Resource Book	from the Sesame Street Firesafety Project; focus on six firesafety areas; offers solid advice on reaching preschoolers; skits and teaching activites included
FEMA	Young Children — A New Target for Public Education	
	Teaching Firesafety Through Exhibits	exhibits to build, skits, activities to do
	Firesafety on Television for Preschoolers — Fire Education for Sesame Street	highlights use of television for teaching fire education to preschool children
	Interviewing and Counseling Juvenile Firesetters: The Child Under 7 Years of Age	
	Urban Fire Education: Seattle Case Study	
NFPA	Firesafety Educator's Handbook	teaching strategies and techniques to reach a wide variety of audiences

FIRESAFETY EDUCATION MATERIALS

Source	Title	Description
IFSTA	Public Fire Education IFSTA 606	manual containing suggestions for reaching different audiences with different types of programs
		Audiovisual materials for teaching
NFPA	Stop School Fires	slide/tape program examines major causes of school fires and offers fire prevention measures against them
Fire Marshal's Association (Mary Nachbar) 14550 Minnetonka Blvd. Minnetonka, MN 55343 (612) 933-2511	It's Only A Drill	slide/tape presentation for teachers and students that destroys false notion that fire drills are unnecessary exercises
		Print materials for working with media
FEMA	Media Idea Workbook	
	Cable Television for the Fire Service	
	Media is the Message — Cooking Fire Prevention Media Workbook	
	Media Guidebook for "America's Burning! Stop Arson!"	
	Fire Education and the News	
NFPA	Firesafety Educators Handbook	manual of firesafety education stategies; section on use of media included
IFSTA	Public Fire Education IFSTA 606	firesafety education manual contains section on making effective use on making effective use of newspaper, television, radio in a firesafety campaign

State Listing of Firesafety Education Mandates

States Where Firesafety Education Is Mandatory In the Classroom

Arkansas (not less than 20 minutes each scholastic week)
District of Columbia
Indiana
Massachusetts
Nebraska (not less than 30 minutes per school month)
New Jersey (not less than 30 minutes per week)
New York (not less than 45 minutes per school month)
North Carolina
Oregon
Pennsylvania
Rhode Island
Virginia
West Virginia

States Where Firesafety Education Is Prescribed by the Department of Education/Education Code

California
Florida
Texas

States Where Firesafety Education Is Not Legislated to be Taught in the Schools

Although the states listed below do not have legislative mandates prescribing that firesafety lessons be taught in the classroom, many of them do have voluntary support from fire marshals, fire department personnel, and educators to teach firesafety in community schools.

Alabama
Alaska
Arizona
Colorado
Connecticut
Delaware
Georgia
Hawaii
Idaho
Illinois
Iowa
Kansas
Kentucky
Louisiana
Maine
Maryland
Michigan
Minnesota
Mississippi
Missouri
Montana
Nevada
New Hampshire
New Mexico
North Dakota
Ohio
Oklahoma
South Carolina
South Dakota
Tennessee
Utah
Vermont
Washington
Wisconsin
Wyoming

Firesafety Education Calendar of Events/1984

February

National Firesafety Education Conference
Washington, DC
February 2-5
Contact:
Mary McCormack, ISFSI (617) 881-5800

Public Education Officers III
California Fire Academy
Asilomar, CA
February 5-11
Contact:
Mary Jennings, Office of State Fire Marshal, (916) 427-4204

Managing Public Fire Education Classes
National Fire Academy
Emmitsburg, MD
February 13-24
Contact:
National Fire Academy, (301) 447-6771

March

Fire Department Instructors Conference
Cincinnati, OH
March 18-22
Contact:
Mary McCormack, ISFSI (617) 881-5800

April

Managing Public Fire Education Classes
National Fire Academy
Emmitsburg, MD
April 9-20
Contact:
National Fire Academy,
(301) 447-6771

Minnesota, Wisconsin and Illinois Public Fire Education Conference
Interlaken, WI
April 18-20
Contact:
Illinois Fire Inspectors Association
(312) 392-6699

May

National Fire Protection Association Annual Meeting
Education Section Meeting
New Orleans, LA
May 21-24
Contact:
NFPA Meetings Dept. (617) 770-3000

Managing Public Fire Education Classes
National Fire Academy
Emmitsburg, MD
May 14-25
Contact:
National Fire Academy (301) 447-6771

June

Public Education Officers IV
California Fire Academy
Asilomar, CA
June 10-16
Contact:
Mary Jennings, Office of State Fire Marshal, (916) 427-4204

July

Managing Public Fire Education Classes
National Fire Academy
Emmitsburg, MD
July 9-20
Contact:
National Fire Academy (301) 447-6771

August

National Learn Not to Burn Conference
NFPA Headquarters, Quincy, MA
August 12-15
Contact:
NFPA Public Education Department
(617) 770-3000

Western Fire Chiefs Conference
Sparks, NV
August 5-7
Contact:
Chief Bart Beckwith, President,
Western Fire Chiefs, (602) 899-9712

September
Managing Public Fire Education Classes
National Fire Academy
Emmitsburg, MD
September 10-21
Contact:
National Fire Academy (301) 447-6771

October
International Society of Fire Service Instructors Fall Meeting
Firesafety Educators Section
Houston, TX
October 25-28
Contact:
Mary McCormack, ISFSI (617) 881-5800

November
National Fire Protection Association Fall Meeting
Education Section Meeting
San Diego, CA
November 12-15
Contact:
NFPA Meetings Department
(617) 328-9290

December
None Scheduled

NOTE: If you would like your firesafety events listed in the *1985 Fire Almanac*, send the name, date, and place of the event; the name of the sponsoring organization; and the name, address, and telephone number of the person to contact for more information to: Editor, *Fire Almanac*, NFPA, Batterymarch Park, Quincy, MA 02269.

Fire Protection in Business and Industry

Large-Loss Fires

Historically, large-loss fires are few in number, but account for a disproportionate amount of the direct fire loss each year. For 1982, the most recent year for which statistics are available, the NFPA estimated that 2.5 million fires of varying severity were attended by the public fire service and $6.4 billion in total property loss resulted from these fires.[1] The large-loss fires reported for 1982 accounted for only .01 percent of the total fires, but the direct dollar loss attributed to these fires accounted for 14.4 percent of the overall property loss.

In addition to the direct losses that result from large-loss fires, substantial indirect losses may result, particularly to businesses and the community in which they are located.[2] A large enterprise may experience a devastating fire and a loss of income from disruption of the normal flow of business. Customers may be forced to go elsewhere and not return if normal business is resumed. As a result, smaller businesses in the community may suffer, especially if their flow of everyday business depended heavily on that single industry. Ultimately, the whole community suffers and may experience a loss of a labor market and tax revenues, as well as incur the burden of paying welfare and other benefits to the unemployed.

Business properties experience the most large-loss fires; however, in recent years there has been an increase in the number of school and church fires reported as large losses. These fires impact the community due to the cost of replacing depreciated buildings and equipment with new facilities and the cost of finding temporary quarters until construction of a new school or church can be completed.

A significant reduction in the dollar loss from fire in the United States can be achieved by correcting the deficiencies that allow large-loss fires to develop. It has been the primary purpose of the "Large-Loss Fire Study" published annually in NFPA's *Fire Journal*®, to report these deficiencies through statistical analyses and detailed reporting of selected fire incidents.

Both the public and private sectors of the community have the responsibility to safeguard property from fire. Building codes, fire prevention codes, and public fire protection are functions of government. Through inspection and enforcement of codes and ordinances, local governments can reduce the threat of a large-loss fire impacting their community. The business community has the responsibility for implementing and adhering to firesafety codes and practices pertinent to their industry. For instance, acceptance of industry-wide firesafety standards can reduce the likelihood of a devastating factory or warehouse fire. An in-place firesafety program that safeguards against arson, a preventive maintenance schedule for equipment, good product storage and housekeeping practices, and inspection of private fire protection systems to ensure operation can all help prevent a potential large-loss fire.

FIRE LOSSES OF $10 MILLION OR MORE IN THE UNITED STATES, 1978-1982

Date	Location	Property Use	Estimated Loss
Jan. 31, 1978	Grand Blanc, MI	Auto Parts Warehouse	10,000,000
Mar. 1, 1978	Los Angeles, CA	DC-10 Aircraft	30,000,000
May 30, 1978	Texas City, TX	Oil Refinery	32,427,300
Sept. 21, 1978	Bensenville, IL	General Warehouse	25,000,000
Oct. 3, 1978	Commerce City, CO	Oil Refinery	20,000,000
Oct. 23, 1978	Los Angeles, CA	Brush and Homes	35,106,000
Nov. 5, 1978	Des Moines, IA	Department Store	25,000,000
Nov. 19, 1978	Stickney, IL	Racetrack Grandstand-Clubhouse	10,000,000
Dec. 26, 1978	West Palm Beach, FL	Jai Alai Fronton	12,000,000
Jan. 6, 1979	San Antonio, TX	Municipal Auditorium	12,000,000
Jan. 16, 1979	London, KY	Mercantile Block	10,000,000
Jan. 17, 1979	Edison, NJ	General Warehouse	30,000,000
Mar. 20, 1979	Linden, NJ	Oil Refinery	14,300,000
Apr. 19, 1979	Port Neches, TX	Tank Ship	32,000,000
June 14, 1979	New York, NY	Department Store	10,000,000
July 31, 1979	Houston, TX	Apartment Complex	20,000,000
Aug. 30, 1979	LaPlace, LA	Tank Barge	10,500,000
Sept. 1, 1979	Deer Park, TX	Tank Ship	77,000,000
Jan. 20, 1980	Borger, TX	Oil Refinery	50,000,000
Feb. 13, 1980	Totowa, NJ	Paper Products Warehouse	10,000,000
Feb. 19, 1980	Huntsville, AL	Multi-Use Industrial Park	26,000,000
Feb. 19, 1980	Spearfish, SD	Lumber Mill	10,000,000
May 13, 1980	Los Angeles, CA	Aircraft Parts Warehouse	10,572,500
June 10, 1980	Newark, DE	Automobile Assembly Plant	13,000,000
June 13, 1980	Covington, VA	Synthetic Fiber Manufacturing	10,152,500
June 23, 1980	New York, NY	Office Building	15,000,000
July 7, 1980	Perth Amboy, NJ	Multi-Use Industrial Park	12,000,000
July 8, 1980	New Orleans, LA	Plumbing Supply Manufacturer	35,250,000
July 29, 1980	Salem, NH	Racetrack Clubhouse	20,000,000
Oct. 14, 1980	Pekin, IL	Electric Power Plant	17,000,000
Oct. 21, 1980	New Castle, DE	Chemical Manufacturer	45,000,000
Nov. 21, 1980	Las Vegas, NV	Hotel	50,000,000
Nov. 24, 1980	San Bernadino, CA	Brush and Homes	38,031,400
Jan. 16, 1981	Fort Worth, TX	Country Club	10,000,000
Feb. 10, 1981	Las Vegas, NV	Hotel	12,900,000
Feb. 14, 1981	Louisville, KY	Sewage System	40,000,000
Mar. 11, 1981	Los Angeles, CA	Electric Equipment Manufacturer	11,075,000
Mar. 18, 1981	Alden, NY	Gasket Manufacturer	13,000,000
Mar. 19, 1981	Kernersville, NC	Textile Plant	14,000,000
Mar. 30, 1981	Tacoma, WA	Department Store	12,000,000
Apr. 7, 1981	Corpus Christi, TX	Grain Elevator	23,000,000
June 22, 1981	Saint Helena, CA	Brush and Homes	35,666,500
Aug. 4, 1981	Bakersfield, CA	TA-7 Navy Aircraft	10,000,000
Oct. 12, 1981	Lynchburg, VA	Furniture Manufacturer	15,000,000
Nov. 28, 1981	Lynn, MA	Lynn Conflagration	70,000,000
Dec. 13, 1981	Greenville, SC	Shopping Mall	30,000,000
Feb. 14, 1982	Kalama, WA	Cargo Ship	15,000,000
Feb. 22, 1982	Santa Rosa, CA	Power Plant	10,500,000
Mar. 7, 1982	Columbia, SC	Military Aircraft	10,000,000
Mar. 14, 1982	Dotham, AL	Cold Storage Warehouse	21,000,000
Apr. 4, 1982	Fairfax, VA	Theater	17,000,000
Apr. 18, 1982	Washington, IA	Train Collision and Fire	15,000,000
Apr. 19, 1982	Sheboygan, WI	Furniture Manufacturer	11,647,300
Apr. 21, 1982	Anaheim, CA	Conflagration (51 buildings)	50,000,000
May 11, 1982	Fall River, MA	Church and Dwellings	20,000,000

Date	Location	Property Use	Estimated Loss
Jun. 6, 1982	Falls Township, PA	Retail Distribution Center	100,000,000
Jul. 7, 1982	Buffalo, NY	Armory	10,000,000
Sept. 29, 1982	Freeport, TX	Power Plant	14,700,000
Oct. 20, 1982	Everett, WA	Process Fishing Vessel	14,000,000
Oct. 29, 1982	Marion, SC	Tobacco Warehouse	15,132,000
Nov. 25, 1982	Minneapolis, MN	Bank Building	91,000,000
Dec. 11, 1982	Luling, LA	Industrial Chemical Storage	10,000,000

The dollar losses in this table may differ from previously published tables since only verified losses of $10 million or more are included and dollar amounts have been updated with new information.

It is recognized that since some fires suspected of causing a loss of $10 million or more could not be verified by a source considered reliable, the listing is not complete.

NOTEWORTHY FIRES IN THE UNITED STATES PRIOR TO 1978 WITH LOSSES OVER $25 MILLION

Date	Location	Property Use	Estimated Loss
Dec. 16, 1835	New York, NY	Conflagration — 674 buildings	$ 26,000,000
Oct. 8, 1871	Chicago, IL	The Great Chicago Fire — 17,430 buildings (250 killed)	168,000,000
Nov. 9, 1872	Boston, MA	The Great Boston Fire — 776 buildings (13 killed)	75,000,000
Feb. 7, 1904	Baltimore, MD	Conflagration — 80 business blocks	50,000,000
Apr. 18, 1906	San Francisco, CA	Earthquake - Conflagration — 28,000 buildings (452 killed)	350,000,000
Oct. 12, 1918	Minnesota	Forest Fires — 4,000 homes (559 killed)	35,000,000
Feb. 9, 1942	New York, NY	S.S. Normandie Ocean Liner	53,000,000
Sept. 15, 1945	Near Miami, FL	Aircraft Hanger	30,000,000
Apr. 16, 1947	Texas City, TX	Cargo Ships and Waterfront Industrial Area (468 killed)	67,000,000
Oct. 23, 1947	Maine	Forest Fires — Over 1,200 homes and other buildings (16 killed)	30,000,000
Aug. 12, 1953	Livonia, MI	Automobile Transmission Plant (6 killed)	32,000,000
Dec. 19, 1960	Brooklyn, NY	U.S.S. Constellation Aircraft Carrier	47,942,000
Nov. 6, 1961	Los Angeles, CA	505 buildings destroyed, 32 others damaged	30,000,000
Jan. 16, 1967	Chicago, IL	McCormack Place Exhibition Hall	52,500,000
Jan. 27, 1967	Cape Kennedy, FL	Apollo Spacecraft Cabin Fire (3 killed)	75,000,000
May 11, 1969	Golden, CO	Nuclear Weapons Plant	26,473,000
Oct. 17, 1970	Marietta, GA	Military C5A Aircraft	30,000,000
Dec. 5, 1970	Linden, NJ	Oil Refinery	50,000,000
May 27, 1973	Chicago, IL	Warehouse Complex	37,000,000
Feb. 27, 1975	New York, NY	Telephone Exchange	60,000,000
Jul. 8, 1977	Fairbanks, AK	Oil Pipeline Pump Station	40,000,000
Dec. 22, 1977	Westwego, LA	Grain Elevator	30,000,000
Dec. 27, 1977	Galveston, TX	Grain Elevator	25,000,000

WHAT IS A LARGE-LOSS FIRE?

In 1931, NFPA's Department of Records used the term "large-loss fire" to introduce the Annual Conflagration Map which spotted U.S. fires for 1930 that resulted in $250,000 or more in property damage. This map complemented the yearly statistics on U.S. fire losses traditionally compiled by the National Board of Fire Underwriters and published by the NFPA. Previous to 1931, the term was used in a 1921 issue of NFPA's *Quarterly* to reference fires compiled by the *Journal of Commerce* that caused losses of $1 million or more. The term was used even earlier in the October 1905 issue of the *Quarterly Bulletin of Special Hazards and Fire Record* to describe fires where the satisfactory activation of an automatic sprinkler system was reported and where the property damage that was described as "heavy" usually referred to water damage.

The Annual Conflagration Map format for reporting large-loss fires that was introduced by NFPA in 1931 continued for several years, establishing the definition of a large-loss fire as a fire that resulted in a direct dollar loss of $250,000 or more to a building and its contents. That monetary definition of a large-loss fire remained the same until 1978. During the 1970s, the number of large-loss fires reported each year to NFPA's Fire Analysis Division (formerly the Department of Records) increased considerably. It was quickly recognized that this phenomenon was due primarily to the rapid growth of monetary inflation (see graphs on the Inflation Factor) and its effect on property values. So in 1978, NFPA redefined a large-loss fire to be a fire resulting in a total direct loss of $500,000 or more. Based on further analysis and the continued dramatic increases in the number of large-loss fires being reported, in 1980 NFPA again redefined a large-loss fire as a fire resulting in a direct total loss of $1 million or more.

"A towering inferno"—that was how veteran fire fighters described this four-alarm fire that occurred April 1, 1983 in a four-story plastic garment bag factory in Paterson, NJ. The building was insured for $1.4 million. More than 60 fire fighters battled the blaze that also damaged a separate but adjoining 3½-story building where a tool and die company was located. (The Bergen Evening Record)

THE INFLATION FACTOR

Continuing monetary inflation has led the NFPA to redefine a large-loss fire as one that causes $1 million or more of direct fire damage. Figure 1 illustrates the inflation of a $500,000 fire loss in 1971 dollars to a $1,178,900 loss in 1980 dollars, as measured by the Producer Price Index of the Bureau of Labor Statistics for 1971 to 1980. Inflation also increases the number of fires that qualify as large-loss fires. Figure 2 illustrates the number of verified fires of $1 million damage or more reported to the NFPA for each of the years 1971 through 1980.

Regardless of which index is used for adjustments, the Producer Price Index or Consumer Price Index, the number of fires resulting in a loss of $1 million or more that were reported to the NFPA was relatively constant, except for an increase in 1979 through 1980. This increase may have been the result of a more intense effort to collect fire data for these years. Since most of the large-loss fires and the resulting dollar losses occur in commercial properties, the Producer Price Index was selected to adjust dollar losses for inflation. This is appropriate because the Producer Price Index is based on the selling price of commodities of producers and manufacturers, as opposed to the Consumer Price Index, which is weighted towards the cost of goods and services purchased by the urban wage earner.

LARGE-LOSS FIRES UNADJUSTED FOR MONETARY INFLATION, 1978-1982

Year	No. of Fires	Loss	Average Loss/Fire
1982	271	$920,428,600	$3,396,416
1981	299	$863,552,800	$2,888,136
1980	324	$947,684,100	$2,924,950
1979	248	$691,765,600	$2,789,377
1978	159	$473,235,400	$2,976,322

The statistics in this table differ from previously published results since only verified losses of 1 million or more are included and since losses have been updated with new information.

Monetary inflation influences the average loss per fire both by increasing the total dollar loss for all large-loss fires and by qualifying as large losses those fires that would otherwise fall below the $1 million threshold.

LARGE-LOSS FIRES ADJUSTED FOR MONETARY INFLATION, 1978-1982

Year	No. of Fires	Loss	Average Loss/Fire
1982	151	$550,717,339	$3,647,135
1981	171	$516,470,667	$3,647,135
1980	193	$630,649,888	$3,267,615
1979	176	$549,326,370	$3,121,170
1978	159	$473,235,400	$2,976,322

Losses are adjusted for monetary inflation as measured by the Producer Price Index, 1978 to 1982, and using 1978 as the base year. The adjustment decreases both the number of fires resulting in a loss of $1 million or more and the total dollar loss for all large-loss fires.

The adjusted tables are important because they allow direct year-to-year comparisons. The statistical information presented in these tables may differ from previously published results since only verified losses of $1 million or more are included in the tables, and since losses have been updated to reflect additional loss information.

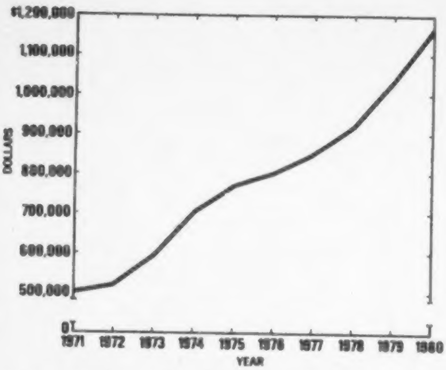


Fig. 1. $500,000 Fire Loss in 1971 Adjusted for Inflation as Measured by the Producer Price Indexes 1971 to 1980

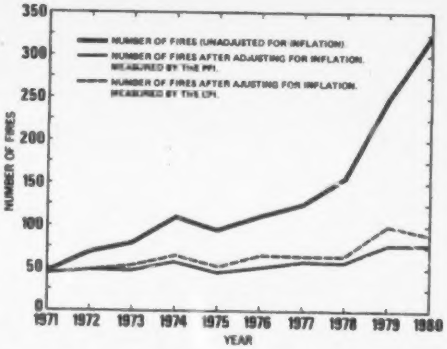


Fig. 2. Increase in Number of Large-Loss Fires as a Result of Monetary Inflation

LARGE-LOSS FIRES BY SIZE OF LOSS UNADJUSTED FOR MONETARY INFLATION, 1978-1982

	$1 Million and Over but less than $3 Million		$3 Million and Over but less than $10 Million		Over $10 Million	
Year	Fires	Loss	Fires	Loss	Fires	Loss
1982	220	$324,810,200	35	$170,639,200	16	$424,979,200
1981	239	$346,625,300	47	$220,286,000	13	$296,641,500
1980	259	$366,697,100	50	$218,980,600	15	$362,006,400
1979	196	$288,309,500	43	$191,956,100	9	$211,500,000
1978	132	$188,152,200	17	$ 75,549,900	10	$209,533,300

LARGE-LOSS FIRES BY SIZE OF LOSS ADJUSTED FOR MONETARY INFLATION, 1978-1982

	$1 Million and Over but less than $3 Million		$3 Million and Over but less than $10 Million		Over $10 Million	
Year	Fires	Loss	Fires	Loss	Fires	Loss
1982	117	$175,078,656	24	$124,710,478	10	$250,928,205
1981	137	$214,974,854	28	$149,074,552	6	$152,421,261
1980	151	$234,307,303	32	$155,521,823	10	$240,820,762
1979	138	$229,160,440	33	$168,254,613	5	$151,911,257
1978	132	$188,152,200	17	$ 75,549,900	10	$209,533,300

Adjusted for monetary inflation as measured by the Producer Price Index, 1978 to 1982, and using 1978 as the base year.

FREQUENCY OF FIRES

Property Division	1978	1979	1980	1981	1982	Totals
Public Assembly	16	22	25	31	32	126
Educational	7	11	27	23	10	78
Institutional	1	1	1	3	2	8
Residential	11	14	27	13	20	85
Stores and Offices	20	36	52	44	52	204
Basic Industry, Utility, Defense, and Communication	8	13	16	15	10	62
Manufacturing	43	65	85	84	66	343
Storage	34	58	69	51	48	260
Special	19	28	22	35	31	135
TOTALS	159	248	324	299	271	1,301

DOLLAR LOSS IN MILLIONS

Property Division	1978	1979	1980	1981	1982	Totals
Public Assembly	44.96	43.54	55.13	64.05	95.42	303.10
Educational	13.49	25.87	52.80	44.62	22.75	159.53
Institutional	3.00	1.20	1.80	4.47	2.50	12.97
Residential	17.70	48.38	96.34	31.90	31.02	225.34
Stores and Offices	49.97	84.38	96.69	113.50	185.38	529.92
Basic Industry, Utility, Defense, Communication	15.45	24.48	48.57	91.58	29.14	209.22
Manufacturing	140.12	126.93	345.71	204.70	150.77	968.23
Storage	87.20	151.82	168.95	115.94	232.30	756.21
Special	101.35	185.15	81.69	192.81	171.16	732.16
TOTALS	473.24	691.75	947.68	863.57	920.44	3,896.68

These tables show both the frequency of large-loss fires and the corresponding dollar loss in millions for each major property division from 1978 to 1982. No adjustments have been made for monetary inflation. Dollar amounts may differ slightly due to rounding off.

Incendiary and Suspicious Large-Loss Fires

From 1978 to 1982, 29 percent of the large-loss fires were determined as incendiary or suspicious in origin (see Figure 3). Although three major property divisions, Manufacturing, Storage, Stores and Offices, experience the most large-loss fires respectively, Storage properties experience the most incendiary and suspicious large-loss fires, followed by the Stores and Offices, and then Manufacturing properties.

Not shown in the graph are the number of incendiary and suspicious fires reported for specific property types within their respective property divisions. For example, 31 percent of the incendiary and suspicious large-loss fires within the Public Assembly division were church fires. Over 83 percent of the incendiary and suspicious fires within the Educational division were experienced by elementary, junior high, or high schools. All but three Institutional fires reported as incendiary occurred in a prison. For Stores and Offices, there were approximately three large-loss incendiary or suspicious fires reported in store properties compared to one in an office building. The incidence of arson was not unique to any one of the specific manufacturing property types; these fires were evenly distributed within the Manufacturing division. For Storage properties, however, 28 percent of the large-loss incendiary and suspicious fires occurred in wood or paper product storage such as lumber yards, furniture storage, or paper storage. An additional 26 percent of these fires occurred in general item storage properties. Unoccupied properties, such as buildings under construction, accounted for 84 percent of the incendiary and suspicious large-loss fires reported for the Special Property division. Overall, the 377 incendiary and suspicious fires shown on the graph accounted for $894 million in direct property damage during the five-year period reported.

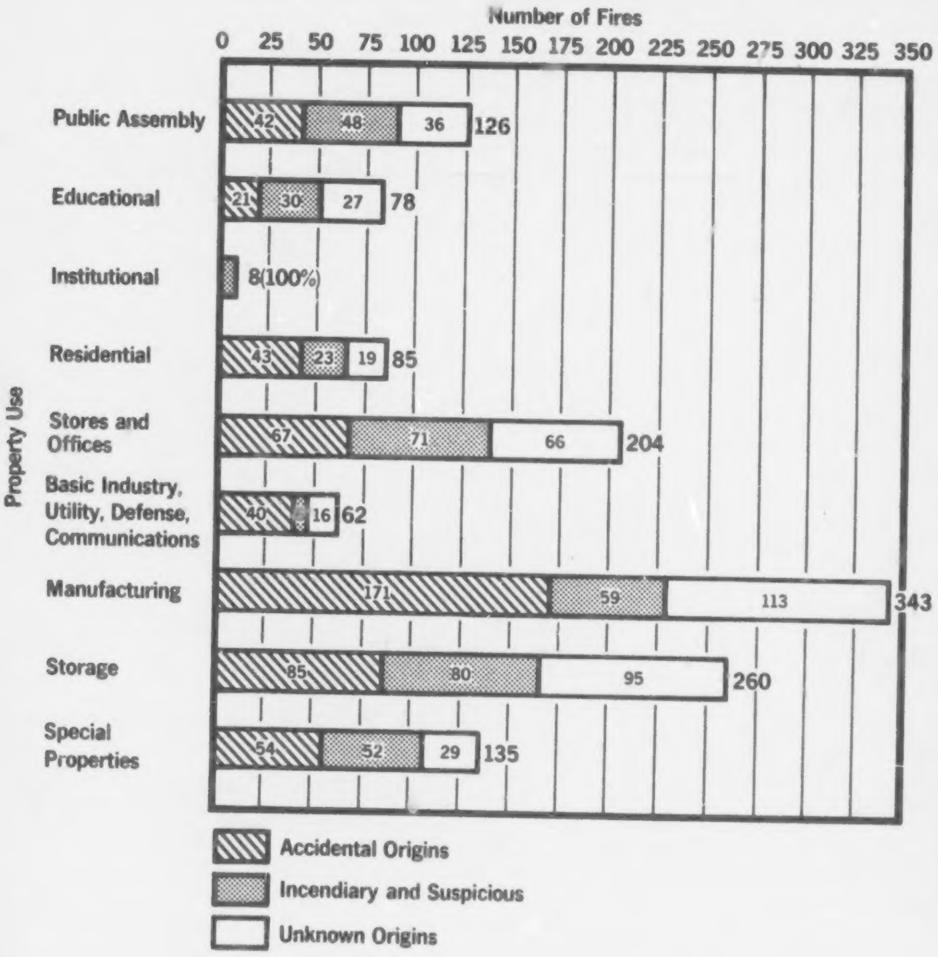


Fig. 3 Origin of large-loss fires by major property divisions, 1978 to 1982.

IGNITION SCENARIOS

The term ignition scenario used in the tables describes the causes of large dollar-loss fires experienced by Store, Manufacturing, and Storage Properties. For each fire report with sufficient information in the data set, a cause was determined by linking form of heat of ignition and ignition factor to build an ignition scenario.[3] The resulting causes or scenarios were then ranked by frequency of occurrence. It is the nature of large-loss fires that in many cases there is not sufficient evidence for the cause to be determined by subsequent investigation. However, the available cause data are sufficient to identify fire problems that exist within certain property groups, and should be considered when evaluating strategies for fire prevention and protection.[4]

The technical terms, *form of heat of ignition* and *ignition factor*, were adapted from NFPA 901 *Uniform Coding for Fire Prevention, 1976* and are defined as follows:

Heat of Ignition: The heat energy which brings about ignition. Heat energy comes in various forms and usually from a specific object or source (e.g., heat from a match, heat from electrical equipment.)

Ignition Factor: The condition or situation that allowed a heat source and combustible material to combine to initiate a fire.

STORAGE PROPERTIES: IGNITION SCENARIOS
UNITED STATES, 1973-1982

Form of Heat of Ignition	Ignition Factor	Percent of Fires	Percent of Dollar Loss
Open flame indendiary device	Incendiary	22.6	15.8
Electrical equipment arcing, overloaded	Mechanical failure malfunction	17.8	15.6
Torches (cutting, welding)	Cutting, welding too close to combustibles	6.0	6.5
Cigarette	Carelessly discarded	4.6	5.0
Spontaneous ignition, chemical reaction	Operational deficiency	4.0	2.1
Exposure fire	Property too close	4.3	3.1
Heat from hot object	Mechanical failure, malfunction	3.7	3.3
Heating systems	Mechanical failure, malfunction	3.4	2.6

Based on 349 fires resulting in a dollar loss of $500,000 or more reported in the NFPA FIDO data. All dollar losses adjusted to 1973 dollars, using the Producer Price Index, total adjusted dollar loss was $375,632,380

All percents in this table refer to this data set

Out of 60 distinct scenarios in this data set, these 8 scenarios accounted for 66.4 percent of the fires and 54.0 percent of the dollar loss

STORE PROPERTIES: IGNITION SCENARIOS UNITED STATES, 1973-1982

Form of Heat of Ignition	Ignition Factor	Percent of Fires	Percent of Dollar Loss
Electrical equipment arcing, overloaded	Mechanical failure malfunction	33.5	37.8
Open flame indendiary device	Incendiary	27.8	26.6
Heating systems	Mechanical failure, malfunction	5.2	4.0
Cigarette	Carelessly discarded	3.6	2.1

Based on 248 fires resulting in a dollar loss of $500,000 or more reported in the NFPA FIDO data. All dollar losses adjusted to 1973 dollars, using the Producer Price Index; total adjusted dollar loss was $168,331,310.

All percents in this table refer to this data set.

Out of 47 distinct scenarios in this data set, these 4 scenarios accounted for 70.1 percent of the fires and 70.5 percent of the dollar loss.

MANUFACTURING PROPERTIES: IGNITION SCENARIOS, UNITED STATES, 1973-1982

Form of Heat of Ignition	Ignition Factor	Percent of Fires	Percent of Dollar Loss
Electrical equipment arcing, overloaded	Mechanical failure, malfunction	26.0	27.7
Open flame, indendary device	Incendiary	12.9	11.5
Torch (cutting, welding)	Cutting, welding too close to combustibles	7.9	10.1
Fuel fired process equipment, heating systems	Mechanical failure, malfunction	7.5	9.7
Heat from hot object (friction, molten or hot material)	Mechanical failure, malfunction	7.0	5.6
Spontaneous ignition, chemical reaction	Operational deficiency	5.2	3.2
Heat from hot object (friction, molten or hot material)	Operational deficiency	3.4	2.7
Fuel fired process equipment, heating systems	Operational deficiency	2.7	1.2
Cigarette	Carelessly discarded	2.2	2.6

Based on 442 fires resulting in a dollar loss of $500,000 or more reported in the NFPA FIDO data. All dollar losses adjusted to 1973 dollars, using the Producer Price Index. total adjusted dollar loss was $463,924,440.

All percents in this table refer to this data set.

Out of 75 distinct scenarios in this data set, these 9 scenarios accounted for 74.8 percent of the fires and 74.3 percent of the dollar loss.

Occurrences of Large-Loss Fires

Figures 1 through 5 that follow profile the occurrence, method of discovery, and the operational status of the property for large-loss fires during 1982. Figure 1 shows that 62.1 percent of the large-loss fires for 1982 occurred between the hours of 6:00 p.m. and 6:00 a.m. Figure 2 shows the occurrence of these large-loss fires by day of the week. Figure 3

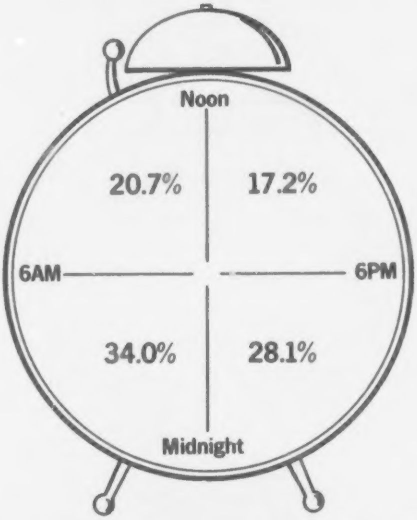


Figure 1 Time distribution of large-loss U.S. fires for 1982, based on 256 fires.

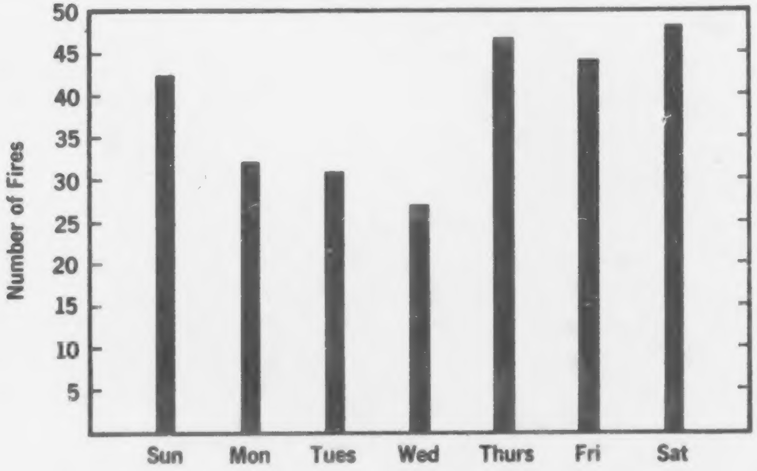


Figure 2 Large-loss U.S. fires for 1982 by day of week based on 271 fires.

shows the distribution of large-loss fires for the four calendar-year quarters during 1982. Figure 4 shows that for most large-loss fires, the property was unoccupied, and Figure 5 shows how the fires were detected. NFPA believes that it is accurate to conclude that many of the fires occurred during the night, gained considerable headway, and were not discovered until they were evident to a passerby.

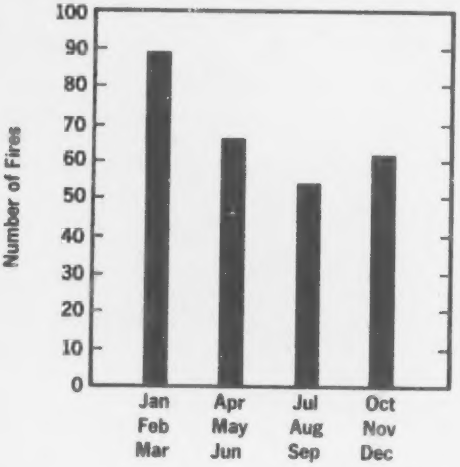


Figure 3

Large-loss U.S. fires for 1982 by calendar-year quarters, based on 271 fires.

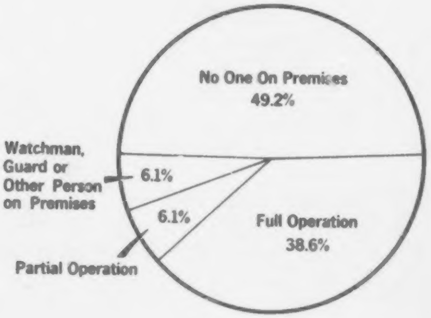


Figure 4 Operating status of property in large-loss U.S. fires for 1982, based on 215 fires.

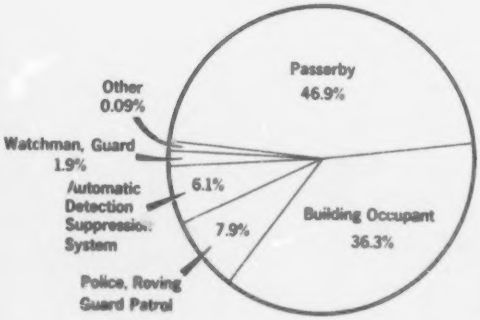


Figure 5

Method of detection in large-loss U.S. fires for 1982, based on 215 fires.

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[2]G.P. McKinnon, ed., *Fire Protection Handbook*, Fifteenth Edition, Quincy, MA, National Fire Protection Association, pp. 2-30, "Indirect Losses."

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Industrial Arson

While the extent of industrial arson may be difficult to identify, data compiled by the Federal Emergency Management Agency (FEMA) estimate that 23.8 percent of fires in industrial occupancies are incendiary/suspicious.

Industrial arson is, in fact, a major problem. The following discussion takes a look at the who, why, where, how, and when of industrial incendiarism, plus defenses against such fires.

Vacant condominiums under construction in San Francisco were the target of an arsonist in early 1983. The project consisted of six buildings with 33 units, of which 12 units were complete. The building of origin was totally destroyed and twelve other buildings were either damaged or destroyed, resulting in an estimated total loss of $1.5 million. (Steve Ringman, San Francisco Chronicle)

ESTIMATES OF U.S. PROPERTY LOSS DUE TO INCENDIARY AND SUSPICIOUS FIRES IN STRUCTURES (1978-82)

	Property Loss				
Types of Fires	1978	1979	1980	1981	1982
Structure Fire of Incendiary Origin	$ 650,000,000	$ 787,000,000	$1,158,000,000	$1,142,000,000	$1,088,000,000
Structure Fire of Suspicious Origin	$ 417,000,000	$ 541,000,000	$ 602,000,000	$ 516,000,000	$ 516,000,000
Total Structure Fire of Incendiary and Suspicious Origin	$1,067,000,000	$1,328,000,000	$1,760,000,000	$1,658,000,000	$1,604,000,000

The estimates are based on data reported to the NFPA by fire departments that responded to the NFPA's Annual Survey of Fire Departments for U.S. Fire Experience (1978-82).

Dollar loss figures represent direct property loss only (loss to contents, structure, a vehicle, machinery, vegetation, or anything else involved in a fire), and do not include indirect losses (e.g., business interruption or temporary shelter costs). Dollar loss estimates are based on figures reported by departments for a year, and no adjustments were made for inflation over the five year period.

ESTIMATES OF U.S. FIRES DUE TO INCENDIARY AND SUSPICIOUS FIRES IN STRUCTURES (1978-82)

	Number of Fires				
Types of Fires	1978	1979	1980	1981	1982
Structure Fire of Incendiary Origin	87,000	88,500	92,000	88,000	77,500
Structure Fire of Suspicious Origin	73,000	60,000	54,000	66,500	51,500
Total Structure Fire of Incendiary and Suspicious Origin	160,000	148,500	146,000	154,500	129,000

The estimates are based on data reported to the NFPA by fire departments that responded to the NFPA's Annual Survey of Fire Departments for U.S. Fire Experiences (1978-82).

Who and Why

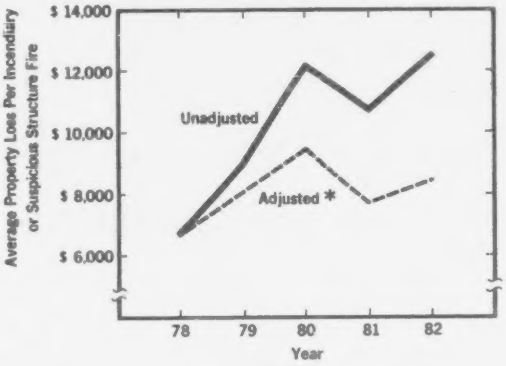
1. Employees

(a) To cover a crime, such as a shortage on the books due to embezzlement, an inventory shortage due to poor management, or an inside-directed theft and looting operation.

(b) To physically express a grievance against plant management, for real or alleged mistreatment, such as not receiving expected salary increases, not being promoted, or being disciplined by a supervisor.

(c) To retaliate against another employee for various reasons, such as the employee being promoted over the firesetter.

Average Property Loss Per Incendiary or Suspicious Structure Fire in the U. S. (1978-1982)



Source: NFPA's Annual Survey of Fire Departments for U. S. Fire Experience 1978-1982

* Adjusted for inflation based on Consumer Price Index: 1978 used as base year.

2. Former Employees

(a) To protest against management for being laid off or furloughed from a job.

(b) To strike back at a supervisor or another employee as the individual responsible for the loss of employment.

Comment: Both employees and ex-employees are particularly dangerous as firesetters because they are familiar with the plant layout and operation, the location of critical areas, points of inadequately secured entrance, location of combustibles and accelerants, operation of the protective system, and general security procedures. To a degree, they can move about the plant with relative freedom and may even have keys to certain locked areas.

3. Competitors

(a) To put the industry out of business.

(b) To interrupt production, thereby causing the plant to lose a contract and providing opportunity for the competitor to secure the contract.

4. Customers

(a) To protest shabby treatment.

(b) To express anger over a faulty product.

5. Special Interest Social and Political Groups

(a) To demonstrate opposition to a product being manufactured or tests being conducted, or against current "fad" targets.

(b) To terrorize and to illustrate the capacity of the group to destroy the industrial facility.

(c) To sabotage plant operations and to reduce or halt production of items utilized by the military.

Comment: On occasion, the social and political interest groups may seem disorganized and lacking in leadership, but their persistent dedication to a cause makes them extremely dangerous. Members of these groups will risk physical harm and arrest to accomplish their goals.

Those individuals committing acts of sabotage, on the other hand, are often well-trained, equipped, and organized to carry out their assignment.

6. Security Personnel

(a) To receive recognition as a fire discovering, fire fighting, and fire extinguishing hero. Working conditions for night watchpersons are far from ideal — long, lonely hours, with little or no recognition or appreciation. The temptation is great for this person to set, discover, and extinguish a small fire. The company president and the company newspaper recognize and award the hero for "saving the plant."

(b) To justify their position, especially when rumors of cutbacks, reduction in force, or contracting with a private agency for security services are circulating.

(c) To ease concern on the part of management that the individual might be too old to perform effectively.

Comment: Security personnel who are physically fit, properly trained, equipped, and supervised can deter would-be arsonists. Qualified individuals can report weaknesses in the security system and respond quickly to emergency situations, such as locating a suspicious object or unauthorized persons on the facility premises. Their duties, responsibilities, and authority must be conveyed to security personnel in readily understandable language.

7. Employees or Outsiders During Labor Disputes

(a) To disrupt plant operations.

(b) To frighten management into settling the dispute.

(c) To intimidate those employees who remain on the job.

Comment: This group can be extremely dangerous as potential firesetters for many of the same reasons that employees and former employees may set fires. In addition to those factors cited under Comment in (1) and (2) above, it must be recognized that during a strike, management-level personnel may be responsible for plant security. These personnel are not familiar with plant protective systems and security procedures normally assigned to security personnel.

8. Intruders

(a) To cover another crime, such as burglary, theft, and pilferage.

(b) To divert security personnel to one area of the plant in order to commit a theft in another area.

(c) To destroy for destruction's sake. Malicious vandalism is often committed without any justifiable reason. Vandalism is identified as the motive for as high as 40 percent of all incendiary fires, and industrial facilities would be most logicial targets for this type of arsonist. Urban area plants would be especially susceptible where abandoned and vacant buildings offer easy access, with minimal security, and little chance of apprehending firesetters.

(d) To create excitement and derive satisfaction, perhaps sexual, from setting and watching the fire. These people fall into the general classification of pyromaniacs, although catagorizing them as emotionally or mentally disturbed individuals with a compulsion to set fires would be more accurate.

Where

1. Storage Locations

Reasons:

- Easy, safe access provides means of quick entry and exit.
- Hidden from view, therefore chances of discovery and interference are minimized.
- Supply of stacked or piled materials normally provides adequate fuel supply.
- Few employees are present, even during working hours.
- Fire cause is likely to be listed as accidental, with only a token investigation conducted.

- Clean-up operations may be initiated immediately after the fire is extinguished, in order to salvage as much stored material as possible and keep the plant in operation. This action makes an effective and productive investigation highly unlikely.

2. Vacant Buildings

Reasons:

- Easy access for juveniles, vandals, and vagrants who use the property to "hang out" or as sleeping quarters.
- Particularly vulnerable if exterior of building has deteriorated.
- Many of the same reasons for storage areas.

3. Docks and Platforms, Including Trucks and Railroad Cars

Reasons:

- Personnel moving in and out to load or unload materials make control difficult.
- Items being loaded or unloaded provide a source of fuel.
- Fire may be the smoldering type and may not break out or be discovered until trucks or railroad cars are some distance from the loading point.

4. Office and Sales Areas

Reasons:

- Less likely targets, as these areas are normally occupied during working hours and during non-working hours access is limited.
- Fuel supply is often limited.
- Motives for setting fires in these areas are not as varied as those of other sections of the facility.

How

Many factors influence how the arsonist sets a fire or fires. Of these factors, probably the most important is motive. Security people and investigators must carefully consider the method used, as this may enable them to establish a motive and take appropriate action both to prevent a repetition of the fire and apprehend the arsonist.

The determined arsonist may set two or more fires simultaneously. If the first attempt was unsuccessful, a second effort may be made within a week or two and may include the use of accelerants.

When

A leading insurer of industrial facilities reports that approximately 70 percent of a company's arson losses occur during non-daylight hours. This emphasizes the need for extremely tight security during hours of darkness, but by no means diminishes the importance of effective security measures during daylight hours.

Prevention and Control of Arson Losses

Arson prevention and control measures fall into two general categories: (1) inert, inanimate steps, such as fencing, lighting, alarm systems, locked doors and windows, etc., and (2) human, animate steps, such as controlling movement of personnel, screening and escorting visitors, recognizing security problems, etc.

1. Stable Controls

(a) *Fencing.* Whether used as perimeter barriers or protection for internal critical areas, fences offer several security advantages. They define the security area, reduce the number of security personnel required, and facilitate deployment of security forces. Although they can not guarantee complete denial of access, fences will delay intrusion to an area, and may serve as a psychological deterrent to a potential intruder. Additionally, fences channel the flow of traffic and personnel to those points controlled by security guards.

The value of a fence is determined by the length of time an intruder is delayed. A fence is only a minor obstacle to a determined intruder and additional features must be added to make penetration more difficult.

Such features include:

- Intrusion detection devices.
- Protective lighting.
- Clear zones, free of structures, trash containers, vegetation, or other objects that might prevent observation of movement and provide concealment for intruders. These areas should be established on both sides of a security fence. Temporary storage and parking should not be permitted in the clear zone and the grass in the zone must not be long enough to conceal a prone person.

(b) *Lighting.* Outdoor protective lighting will deter the intruder, improve the effectiveness of fencing, and provide increased visibility for security personnel. If the plant contains a "target" industry or has suffered one or more recent incendiary fires, the need for effective lighting becomes even more critical. Increased lighting is necessary in areas containing combustible material or flammable fuels.

Lighting is of four general types:

- Continuous, which consists of fixed units providing overlapping cones of light that completely illuminate an area.
- Command, similar to continuous, but activated either manually or automatically when necessary.
- Mobile or movable, which may be mounted on a security vehicle or hand carried by individuals.
- Emergency, which may involve all of the above, but has an independent emergency power source.

Comment: Light fixtures must be protected against tampering through the use of wire guards and should be installed on metal poles with protected internal wiring. Lighting must be inspected frequently to assure that it is in working condition.

(c) *Locks and other controls for doors and windows in critical areas.* Exterior doors and gates that are not supervised by security personnel should be kept locked at all times, if locking them does not interfere with plant operation or safe evacuation of personnel in an emergency.

Comment: When appropriate, doors, windows, and other entry points must be protected with bars, heavy wire mesh, or other safeguards. Points of entry should be checked frequently to assure that locks, hinges, frames, doors, windows, and gates are in good repair. If a fire occurs in a locked area, locks should be rekeyed or combinations changed. Locks should be replaced if there are indications that unauthorized personnel may have keys to these locks. Storage areas, fuse boxes, and electrical system controls must be secured against tampering.

(d) *Alarms.* Intrusion detection alarm systems are designed to detect, not prevent, an intrusion or attempted intrusion. To be of value, an alarm system must be supported by personnel who can effectively respond to the alarm and know what to do when they reach the location of the trouble which triggered the alarm.

For industrial facilities, two types of alarm systems are most frequently used:

- Central station alarms in which signals are relayed to a central station. Personnel located at that point will notify the police and request response by a patrol car, and in many instances will dispatch their own patrol units to the scene.

- Proprietary alarms in which signals are relayed to a location that is owned, staffed, and operated by the protected facility. This is effective only when the operation is of sufficient size to justify its own response personnel.

Comment: Regardless of the type of system used, precautions must be taken to insure that (1) the system is relatively tamperproof, (2) has an emergency power source and, (3) does not generate frequent nuisance alarms which interfere with plant operation, cause personnel to ignore them, and lead to a slower response to alarms by security personnel.

(e) *Good housekeeping*. Accumulation of trash, used work rags, and combustible debris must be avoided. Such items must be removed promptly, thus eliminating a fuel source for a potential arsonist. Trash should not be allowed to accumulate in mop rooms, stairways, storerooms, cafeteria and vending areas, or anywhere in the complex. Flammable liquids should be strictly controlled and stored in a properly safeguarded, locked area.

(f) *Sprinkler control valves*. Valves should be locked in the open position. Locks or other securing devices must be sturdy and must be inspected frequently when an industrial facility is identified as a likely target for arson.

(g) *Special precautions, vacant buildings*. These structures are often targets for fires by trespassers, including children, vandals, and vagrants.

Special arson prevention steps for vacant buildings include:

- Maintenance of building exterior and adjacent grounds.
- Adequately secured doors.
- Repaired or boarded-over broken windows.
- Sprinkler system capability maintained.
- Communication service for security personnel in the form of a two-way radio if telephone service is not available.

2. Human, animate preventive measures. The second category of controls involves, in the majority of cases, actions taken by individuals which impact on the behavior of other individuals. Such actions are not confined to those taken by security personnel, but involve plant personnel at various levels.

(a) *Management responsibility*. Since fires set by employees and former employees account for a significant number of incendiary industrial fires, management must strive to reduce the motivation for firesetting by these individuals. Supervisory personnel at all levels must attempt to maintain good relationships with employees and deal effectively with the disgruntled employee.

Perhaps of greater importance is the role which plant management must play in developing rapport with the community. Obviously, individuals in a hostile community are more likely to set fire to the facility and, further, will not be greatly concerned if the plant suffers from an incendiary fire, except for selfish reasons such as loss of employment.

(b) *Security personnel*. The duties and responsibilities of security personnel fall into three catagories: employee control, visitor control, and general security services.

(1) Employee Control

- Employees should be restricted to their own work areas, if practical, and should be allowed to leave these areas only for work-related reasons.
- Key to personnel control is identification. Entry into the plant or into restricted areas should be permitted only on the basis of personal recognition of the employee or proper display of a pass or badge. Personal recognition is practical only when the number of employees is 25 or less. Checking of passes has a tendency to become perfunctory and security personnel must be reminded frequently to check photographs, expiration dates and signatures, and to examine passes for signs of alteration and tampering.

- Within reasonable limits and respecting the rights of individuals, search must be conducted of all bundles and briefcases that workers carry into the building.

(2) Visitor Control

- Positive identification must be made of all vendors and service people. Individuals in uniforms seem to affect normal security procedures. It is significant that men posing as telephone repairmen had total access to survey an industrial facility for two weeks in preparation for coordinating one of the biggest incendiary industrial fires of all times.
- Visitors must register and furnish positive identification. All packages should be checked. Identification badges must be issued which are to be turned in on leaving the facility.
- Visitors should be escorted while on the premises, if possible. If this procedure is not practical, persons in the facility should be notified that they have visitors and requested to come to the security area to identify and assume security responsibility for these individuals until such time as they return to the security area. A somewhat less effective procedure is to notify persons in the plant that visitors are enroute to their office/work area and request that they inform security personnel when the visitors reach their destination. Whatever procedures are used, visitors must display issued passes at all times.
- Visitors must be limited to certain areas by whatever means are necessary. All plant personnel should be alert for strangers wandering around the property and should not hesitate to ask who they are and what they are doing in the area. Security people cannot be everywhere and every employee must contribute to plant security.

(3) General Security Services

- All entrances and exits should be guarded.
- Security patrols should be conducted around the clock. It is important to vary the pattern of these patrols, as intruders may study the timing and route of patrols and use this knowledge to plan the intrusion.
- All security systems, such as alarms, locks, fencing, and lighting must be checked periodically. Utilize the janitorial force in this program, making them an important element in the security network, particularly requesting that they be alert for changes in the normal appearance in public areas of the plant.

Actions Following an Incendiary Fire

There will be industrial arson fires; no facility is immune to the threat. In anticipation of this possibility, standard operating procedures should be developed for dealing with this situation. The procedures should specify who will be responsible for coordinating the investigation; and who will be on the investigation team, whether in-plant security personnel, local and/or state fire and law enforcement personnel, private investigators retained by the industry, or a combination of all of these.

Whatever procedures are developed, there are two major considerations:

- All fires, regardless how small, should be investigated. So-called "minor fires" may indicate the presence of an arsonist or may signal the beginning of a serious problem. If the fires persist, information on these minor fires may be essential in developing a pattern and studying the *modus operandi* of the firesetter.
- The area of origin of the fire should be left undisturbed until a thorough fire scene examination is completed. There may be pressure to downplay the fire, to clean up, to get back into production. Such action will make any possibility of a successful investigation, apprehension, and prosecution remote. If outside investigators are called in to participate, they should be given an opportunity to survey the scene, examine burn patterns, eliminate accidental causes, and in general, conduct an effective investigation.

OSHA Fire Brigade Regulations Explained

Background

In September, 1980, the Occupational Safety and Health Administration (OSHA) published new requirements for employee safety during fire emergencies and for employee fire brigades. The objective of the new requirements was to provide performance-oriented standards that would allow the employer to exercise one of five options at each facility. These options are explained later in this article.

Requirements

The new requirements are contained in Title 29 of the Code of Federal Regulations; specifically, Sections 1910.38 and 1910.156. The former section sets requirements for emergency action plans and fire prevention plans; the latter section sets requirements for fire brigades. It is important to understand that 29 CFR 1910.38, of itself, does not require an employer to provide either an emergency action plan or a fire prevention plan. However, if an employer is required to provide such a plan by another OSHA regulation or if he voluntarily elects to provide such a plan, then it must comply with 29 CFR 1910.38. Similarly, it is not OSHA's intent to mandate the formation of a fire brigade at each industrial facility. But, if a fire brigade is established, it must comply with 29 CFR 1910.156.

Elements of an Emergency Action Plan

The following elements of an emergency action plan are the minimum that must be addressed, according to 29 CFR 1910.38.

- Emergency evacuation routes and procedures.
- Procedures for shutdown of critical operations.
- Procedures to account for all employees after evacuation.
- Rescue and medical duties, if necessary.
- Means of reporting fires and other emergencies.
- Identification of persons who can provide information and explanation of the plan.

The plan must be in written form for facilities employing more than 10 persons. Section 1910.38 further sets requirements for an alarm system and for dissemination of the plan to employees.

Elements of a Fire Prevention Plan

The following elements of a fire prevention plan are the minimum that must be addressed, according to 29 CFR 1910.38.

- A list of major hazards and proper handling and storage procedures.
- Potential ignition sources and their control.
- Fire protection equipment or systems and their use.
- Identification of personnel responsible for fire protection equipment and systems.
- Identification of personnel responsible for control of fuel sources.
- Housekeeping.

The plan must be in written form for facilities employing more than 10 persons. Section 1910.38 sets further requirements for housekeeping, training, and maintenance.

Options for Handling a Fire Emergency

The employer may chose from five options in deciding how each facility will respond to a fire emergency:

1. Total evacuation — no fire fighting by employees.
2. All employees in the fire area will respond to fight the fire. (Except those assigned to emergency shutdown duties.)
3. Only designated employees in the fire area respond; all others either evacuate or are assigned to emergency duties.
4. An organized fire brigade will respond; all others in the fire area evacuate or are assigned to emergency shutdown duties.
5. An organized "structural" fire brigade will respond; all others in the fire area evacuate or are assigned to emergency shutdown duties.

It is important to understand that Options 2, 3, and 4 are only viable for incipient stage fires. OSHA defines an incipient stage fire as one which can be controlled or extinguished by portable extinguishers, Class II standpipe, or small hose (5/8 in. to 1½ in. diameter) without the need for protective clothing or breathing apparatus. Option 5 must be chosen if employees are expected to fight a fire that has gone beyond the incipient stage.

OSHA GUIDELINES FOR FIRE RESPONSE

Requirements	Option 1	Option 2	Option 3	Option 4	Option 5
Emergency Action Plan*	M	R	R	R	R
Evacuation Plan*	M	—	R	R	R
Fire Prevention Plan*	R	R	R	R	R
Alarms	M	M	M	M	M
Fire Brigade Organization Statement	—	—	—	M	M
Fire Brigade Training	—	—	—	Annually	Quarterly
Protective Equipment	—	—	—	NR	M
Medical Screening	—	—	—	NR	M

*May be mandatory per other OSHA Standards

Legend
M — Mandatory
NR — Not Required
R — Recommended

OSHA States

The US Occupational Safety and Health Administration has accepted the state OSHA plans for the following states:

Alaska
Arizona
California
Connecticut
Hawaii
Indiana
Iowa
Kentucky
Maryland
Michigan
Nevada
New Mexico
North Carolina
Oregon
South Carolina
Tennessee

Utah
Vermont
Virginia
Washington
Wyoming

Guam
Mariana
Puerto Rico
US Virgin Islands

Note: New York State has submitted a state OSHA plan for federal approval; however, as of October 1982, that approval has not been issued.

Average Cost of Hardware and Equipment for Industrial Fire Protection and Suppression

The following price ranges are as of mid-1982. Due to the constant fluctuation in prices, however, all prices listed here are subject to change. In addition, these prices represent single unit pricing; no adjustments have been made for competitive bidding or quantity discounts.

ITEM	PRICE RANGE
Detectors	
flame detector	$ 60.00
smoke/heat detector	90.00
rate of rise/fixed temperature detector	13.00-16.00
alarm horn	33.00
Extinguishers	
2 ½ gal stored-pressure, water-type	$40.00-50.00
2 ½ gal water pump type	65.00-108.00
halon	33.00-127.00
carbon dioxide	68.00-150.00
dry chemical (hand portable)	15.00-140.00
150 lb wheeled dry chemical	1,300.00-1,370.00
Class D (for metal)	250.00
First Aid Equipment	
first aid kit	40.00-80.00
backboard (short)	50.00
backboard (long)	110.00
fire blanket (with container)	37.75-126.00
water jel fire blanket	297.00
portable resuscitator/respirator	200.00-500.00
stretcher (folding)	78.00
stokes litter	125.00
Hoses, Nozzles, Etc.	
Fire Fighter Hose	
50 ft length, 1 ½ in., coupled	58.00
50 ft length, 1 ¾ in., coupled	67.00
50 ft length, 2 ½ in., coupled	92.00
50 ft length, 3 in., coupled	132.00
Industrial Hose	
1 ½ in.	1.06 per ft, coupled
2 ½ in.	1.76 per ft, coupled
linen hose reel (without hose or valve)	46.00-53.00
single jacket hose reel	50.00-68.00
double jacket hose reel	46.00-71.00
Nozzles	
standpipe nozzles (brass)	8.00-62.00
standpipe nozzles (chrome)	10.00-70.00

ITEM	PRICE RANGE
standpipe fog nozzle (brass)	23.00
Underwriter's playpipe	133.00
playpipe with removable fog nozzle, 2 ½ in. base	629.00
hydrant house	420.00-845.00
bypass eductor, 95 gal/min	600.00
hydrant wrench	18.00-25.00
spanner wrench	8.00
hose washer (portable)	388.00
3-inlet monitor	2,340.00
gated wye	150.00
Protective Clothing	
turnout coat	136.00-192.00
turnout pants	98.00-134.00
Nomex® jumpsuits	100.00-125.00
gloves (pair)	5.00-43.00
helmet	60.00-70.00
hard hat	5.45
Nomex® hood	21.00-26.00
safety hood	121.00-370.00
rubber boots (short)	49.00-60.00
rubber boots (long)	66.00-74.00
chemical suits	700.00-1,630.00
aluminized rescue suits	378.00-1,170.00
life belt	100.00
goggles	2.65-4.45
Safety Cans	
safety storage cans	27.00-39.00
safety dispensing cans	69.00-79.00
safety tilt can	125.00-373.00
oily waste cans	43.00-93.00
fire check waste paper receptacles	21.00-113.00
flammable liquids storage cabinet	530.00-710.00
Tools, Etc.	
fire cart	430.00-1,616.00
portable foam fire fighter's cart	1,650.00
hydraulic rescue kit (10 tons)	1,025.00
salvage cover	44.00-186.00
flashlight	8.00-35.00
axe	18.00-130.00
pike pole	32.00-112.00
hooligan tool	85.00-90.00
crowbar	16.00-32.00
rescue saw	1,050.00
hand lamps	20.00-115.00
emergency safety lights	75.00-298.00
smoke ejectors	345.00-820.00
portable electric power generators	529.00-2,800.00

People to Contact at NFPA with Technical Fire Protection Questions

Boilers and furnaces
Fossil fueled steam electric generating stations
Hydroelectric stations
Industrial trucks
Mines

Nuclear energy
Ovens and furnaces
Rapid transit systems
Waste water treatment facilities
Water cooling towers

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Chemicals
Combustible metals
Explosion protection
Explosives
Fireworks
Industrial loss prevention
Plastics
Pyrotechnics

Robert Benedetti

Air conditioning
Building construction
Fire doors and windows
Incinerators, waste and linen handling
Solid fuel heating appliances
Vapor removal from commercial cooking equipment

John Bouchard

Electricity
National Electrical Code®, NFPA 70

John Cologgero
Peter Schram
Joe Tedesco

Firesafety Symbols
Fire tests
Life Safety Code®, NFPA 101®

Ronald Cote'

Flammable liquids

Martin Henry

Extinguishing systems (water, foam)
Fire pumps
Foam systems
Forest products
Fur storage
General storage
Rack storage
Record protection
Rubber tires
Standpipe systems
Underground piping
Water spray
Water tanks

Robert Hodnett

Marine

Charles Keller

Health care facilities

Burton Klein

Life Safety Code®, NFPA 101®
Parking garages
Repair garages

James Lathrop

Gases

Wilbur Walls

Detectors
Electronic computers
Emergency power supplies
Extinguishing systems (halon, dry chemical, CO_2)
Libraries, museums, historic buildings
Lightning protection
Mobile homes, RVs, dwellings
Portable extinguishers
Signaling systems and fire detectors

Charles Zimmerman

Fire Research Laboratories

There are many laboratories in the United States capable of performing, to varying degrees, fire-related research. Broadly speaking, these laboratories can be classified into three general categories: 1. private and industrial laboratories, 2. university laboratories, and 3. government laboratories.

Representative laboratories in the private sector are Underwriters Laboratories Inc., Factory Mutual Research Corporation, and Southwest Research Institute; in the academic sector, Ohio State University; and in the government sector, the National Bureau of

Standards. Fire research is by no means limited to these laboratories. In fact, there has been a marked increase in research activity in recent years as a result of a heightened national interest in firesafety and health-related issues.

A good source of information on the extent of fire research and the laboratories involved in it in the United States is the *Directory of Fire Research.* It is published by the Committee on Fire Research of the Division of Engineering, National Research Council, National Academy of Sciences, 2101 Constitution Ave., Washington, DC 20418. The latest (8th edition) of the Directory is dated 1978 and is the last edition to be published by the National Academy of Sciences as part of the work of the Committee on Fire Research of the National Research Council. Work on that volume was in progress when the decision to disband the Committee was made.

The following descriptions of the activities of these representative laboratories are given to indicate the types of activities in which fire research-oriented laboratories are engaged. Inclusion in the listing is in no way an endorsement of the laboratories by the NFPA.

Underwriters Laboratories Inc.

Underwriters Laboratories Inc. (UL), with headquarters at 333 Pfingsten Rd., Northbrook, IL 60062, is a nonprofit corporation. Its sole objective is the promotion of public safety through conduct of "scientific investigation, study, experiments, and tests, to determine the relation of various materials, devices, products, equipment, constructions, methods, and systems to hazards appurtenant thereto or to the use thereof affecting life and property and to ascertain, define, and publish standards, classifications, and specifications for materials, devices, products, equipment, constructions, methods, and systems affecting such hazards, and other information tending to reduce or prevent bodily injury, loss of life, and property damage from such hazards."

The organization was founded in 1894 by the fire insurance industry under whose sponsorship it operated until 1968 when it became an independent, public service-type corporation. It has no capital stock, nor shareholders, and exists solely for the service it renders in the fields of fire, crime, and casualty prevention.

Factory Mutual Research Corporation

Factory Mutual Research Corporation (FM) is located at 1151 Boston-Providence Turnpike, Norwood, MA 02062. Its function is to conduct research and development in the field of property loss control. This activity serves the needs of the Factory Mutual System and is available to other entities, such as government agencies, trade associations, and individual businesses, through contracts.

The scope of the research ranges from basic research into the nature of fire to the development of standards for direct use by industry in establishing practices designed to minimize loss. Although such standards are intended primarily for Factory Mutual System members, they are recognized and widely used by others. Between the extremes of basic research and standards, major effort is made in the area of applied research. This activity includes: studies, surveys, operations research, experimentation, laboratory scale testing and full-scale testing to evaluate hazards and protection of storages, manufacturing operations, and construction arrangements.

Southwest Research Institute

The Southwest Research Institute (SwRI), located at 6220 Culebra Rd., San Antonio, TX 78284, is a nonprofit organization devoted to government and industrial research. SwRI's Department of Fire Technology has a staff of professional personnel encompassing disciplines of organic, physical, analytical, and polymer chemistry, chemical engineering, mechanical engineering, fire services technology, and inhalation toxicology. The Department is organized into four sections, each focusing on a different aspect of the technology of fire.

The Standard Testing Services section offers 35 tests, including ignition, flame spread, smoke development, and fire endurance. The Fire Performance Evaluations section conducts a wide variety of large-scale fire evaluations of materials and assemblies, often on a custom-designed basis. The section also performs many specialized large-scale tests including those for smoke detectors and fire penetration through seal installations at openings in fire barriers.

The Fire Chemistry Section offers services in combustion and fire gas analysis, along with the development of specialized analytical procedures as may be required. Heat release calorimetry, including the use of a room-sized calorimeter for the study of assemblies, is also offered.

The Applied Environmental Toxicology section conducts a variety of smoke toxicity tests using both standard and custom-designed methodology. Included in these studies are both lethality and incapacitation determinations, generally using rodents as animal models.

Center for Fire Research, National Bureau of Standards

The National Bureau of Standards' Center for Fire Research is located in the NBS complex at Gaithersburg, MD. The laboratory conducts research designed to improve codes and standards. This work is done by developing improved or new test methods and by the use of large-scale tests to validate the test method developments. Work is also conducted on developing knowledge of the properties of materials and their performance in fire conditions. The laboratories also develop mathematical models to predict performance of materials under fire conditions.

Ohio State University

Fire research at Ohio State University, Columbus, OH, includes a wide range of activities. The Building Research Lab in the College of Engineering, which includes the School of Architecture, maintains facilities for evaluating the performance characteristics of building materials and building construction systems. The fundamental combustion characteristics of structure designs, materials, and contents are also studied. Such data permit computer modeling of simulated fire scenarios, which can then be verified experimentally in full-scale compartment tests. These experiments can also include measurement and identification of the thermal and chemical products of combustion.

The bioeffects of fire exposure on both man and animals are studied in cooperation with the Colleges of Medicine and Veterinary Medicine. Studies of the human response to a fire emergency are examined by the College of Behavioral Sciences. Methods of improved audio and visual communications are developed by communications specialists and the Vision Research Institute. Problems in fire risk management are explored by The College of Administrative Sciences, with the campus community of the University serving as a testing ground for the fire prevention and control systems involved.

Listing of Fire Research Laboratories

The following list of fire research laboratories was current in 1978 when the 8th (and final) edition of the *Directory of Fire Research* was published. The listing includes information on the principal foreign laboratories working in fire research.

WE WANT TO KNOW . . .
if a name, an address, or a phone number has changed; if there's an upcoming event, a new program or course, a new publication being offered. If you have more current information than is contained in this *Almanac*, know something that should be included in this book, or just have something interesting about the fire protection scene that you want to contribute, please let us know. Write: Editor, *Fire Almanac*, NFPA, Batterymarch Park, Quincy, MA 02269. All suggestions will receive our careful attention.

Federal Government

Department of Agriculture

Agriculture Research Service
Southern Regional Research Center
P.O. Box 19687
New Orleans, LA 70719

Forest Service
Forest Products Laboratory
P.O. Box 5130
Madison, WI 53705

Forest Service
Intermountain Forest and Range
 Experiment Station
Northern Forest Fire Laboratory
Drawer G
Missoula, MT 59801

Forest Service
North Central Forest Experiment Station
Michigan State University
East Lansing, MI 48823

Forest Service
Pacific Northwest Forest and Range
 Experiment Station
P.O. Box 3141
Portland, OR 97208

Forest Service
Pacific Southwest Forest and Range
 Experiment Station
P.O. Box 245
Berkeley, CA 94701

Riverside Forest Fire Laboratory
P.O. Box 5007
Riverside, CA 92507

Forest Service
Rocky Mountain Forest and Range
 Experiment Station
240 W. Prospect St.
Fort Collins, CO 80521

Forest Hydrology Laboratory
Arizona State University
Tempe, AZ 85821

Forest Service
Southeastern Forest Experiment Station
Southern Fire Laboratory
P.O. Box 5106
Macon, GA 31208

Forest Service
Southern Forest Experiment Station
T-10210 Postal Services Building
701 Loyola Ave.
New Orleans, LA 70113

Forest Science Laboratory
P.O. Box 906
Starkville, MS 39759

Department of the Army

Air Mobility Research and Development Laboratory
Fort Eustis, VA 23604

Frankford Arsenal
Pitman-Dunn Laboratory
Philadelphia, PA 19137

Materials and Mechanics Research Center
Organic Materials Laboratory
Watertown, MA 02172

Mobility Equipment Research and Development Command
Fort Belvoir, VA 22060

Natick Research and Development
 Command
Kansas St.
Natick, MA 01760

Tank-Automotive Research and Development Command
28251 Van Dyke Ave.
Warren, MI 48090

Department of Commerce

National Bureau of Standards
Center for Fire Research
Washington, DC 20234

Department of Energy

1000 Independence Ave., SW
Washington, DC 20585

Lawrence Livermore National Laboratory
P.O. Box 808
Livermore, CA 94550

Department of the Interior

Bureau of Mines
Pittsburgh Mining and Safety Research Center
4800 Forbes Ave.
Pittsburgh, PA 15213

Spokane Mining Research Center
E. 315 Montgomery Ave.
Spokane, WA 99207

Department of the Navy
National Naval Medical Center
Naval Medical Research Institute
Bethesda, MD 20014

National Parachute Test Range
Materials Laboratory Department
El Centro, CA 92243

Naval Air Development Center
Warminster, PA 18974

Naval Research Laboratory
4555 Overlook Ave.
Washington, DC 20375

Naval Ship Engineering Center
Philadelphia, PA 19112

Naval Training Equipment Center
Orlando, FL 32813

Department of Transportation
Federal Aviation Administration
National Aviation Facilities Experimental Center
Atlantic City, NJ 08405

National Aeronautics and Space Administration
Ames Research Center
Code SC, Mail Stop 223-6
Moffett Field, CA 94035

Lewis Research Center
21000 Brookpark Rd.
Cleveland, OH 44135

State Government

New York State Department of Health, Burns Care Institute
Tower Building, Room 557
Empire State Plaza
Albany, NY 12237

Universities

Brown University
Providence, RI 02912

University of California at Berkeley
Department of Mechanical Engineering
Berkeley, CA 94720

University of California/San Diego
Department of Applied Mechanics and Engineering Sciences
La Jolla, CA 92093

Cornell University
Sibely School of Mechanical and Aerospace Engineering
Ithaca, NY 14853

Duke University Medical Center
F.G. Hall Laboratory for Environmental Research
Durham, NC 27710

Georgia Institute of Technology
School of Aerospace Engineering
Atlanta, GA 30332

School of Mechanical Engineering
Atlanta, GA 30332

Harvard University
Division of Engineering and Applied Physics
Cambridge, MA 02138

University of Illinois at Chicago Circle
Department of Energy Engineering
Box 4348
Chicago, IL 60680

University of Illinois
Combustion Laboratory
Urbana, IL 61801

The Johns Hopkins University
Applied Physics Laboratory
Johns Hopkins Rd.
Laurel, MD 20810

Louisiana State University
School of Forestry and Wildlife Management
Baton Rouge, LA 70803

University of Maryland
Department of Textiles and Consumer Economics
College Park, MD 20742

Fire Protection Curriculum
College of Engineering
College Park, MD 20742

University of Michigan
School of Public Health
Ann Arbor, MI 48109

University of Minnesota
Heat Transfer Laboratory
Mechanical Engineering Department
Minneapolis, MN 55455

University of Montana
Wood Chemistry Laboratory
Missoula, MT 59801

Polytechnic Institute of New York
Chemistry Department
333 Jay St.
Brooklyn, NY 11201

University of Notre Dame
Department of Aerospace and Mechanical Engineering
Notre Dame, IN 46556

University of Oklahoma
Flame Dynamics Laboratory
1215 Westheimer Dr.
Norman, OK 73069

Pennsylvania State University
Noll Laboratory for Human Performance Research
University Park, PA 16802

University of Pittsburgh
Graduate School of Public Health
130 DeSoto St.
Pittsburgh, PA 15261

Purdue University
Engineering Experiment Station
West Lafayette, IN 47907

University of Utah
Flammability Research Center
Salt Lake City, UT 84112

University of Washington
College of Forest Resources, AR-10
Seattle, WA 98198

Private and Industrial Laboratories

Albany International Corp.
Fire Research Laboratory
1000 Providence Highway
Dedham, MA 02026

American Cyanamid Co.
Chemical Research Division
1937 W. Main St.
Stamford, CT 06904

Chemical Research Division
Bound Brook, NJ 08805

The Ansul Co.
Research and Development Laboratory
One Stanton St.
Marinette, WI 54143

Auerbach Associates, Inc.
121 North Broad St.
Philadelphia, PA 19107

Celanese Research Co.
P.O. Box 1000
Summit, NJ 07901

Chemonics Industries
Fire-Trol Laboratory
P.O. Box 21568
734 E. Southern Pacific Dr.
Phoenix, AZ 85036

E. I. du Pont de Nemours and Company, Inc.
Haskell Laboratory
1007 Market St.
Wilmington, DE 19898

FMC Corporation
Ordnance Engineering Division
1105 Coleman Ave.
San Jose, CA 95108

Engineered Systems Division
Advanced Mining Systems
328 Brokaw Rd.
Box 450
Santa Clara, CA 95052

Factory Mutual Research Corporation
1151 Boston-Providence Turnpike
Norwood, MA 02062

Falcon Research and Development Co.
1225 S. Huron St.
Denver, CO 80223

The Firestone Tire and Rubber Co.
Central Research Laboratories
1200 Firestone Parkway
Akron, OH 44317

Forensic Engineers, Inc.
6233 Brookview Ave., S.
Edina, MN 55424

Gage-Babcock and Associates, Inc.
135 Addison Ave.
Elmhurst, IL 60126

General Electric Co.
Materials Analysis and Test Laboratory
1285 Boston Ave.
Bridgeport, CT 06602

Corporate Research and Development
3135 Easton Turnpike
Fairfield, CT 06431

Plastics Laboratory
Major Appliance Laboratories
Appliance Park 35-1113
Louisville, KY 40225

General Electric Co.
Central Research
Plastics Division
One Plastics Ave.
Pittsfield, MA 01201

B.F. Goodrich Chemical Co.
P.O. Box 122
Avon Lake Technical Center
Avon Lake, OH 44012

Gulf and Western Manufacturing Co.
Gamewell/Alarmtronics Division
91 Bartlett St.
Marlboro, MA 01752

Horizons Research Inc.
23800 Mercantile Rd.
Cleveland, OH 44122

Hough Laboratory
P.O. Box 1505
Springfield, OH 45501

Hughes Aircraft Co.
Santa Barbara Research Center
75 Coromar Dr.
Goleta, CA 93017

Arthur D. Little, Inc.
Acorn Park
Cambridge, MA 02140

IIT Research Institute
10 W. 35th St.
Chicago, IL 60616

Lockheed-California Co.
Rye Canyon Laboratories
P.O. Box 551
Burbank, CA 91520

McDonnell Douglas Corp.
Douglas Aircraft Co.
Biomedical Laboratory
3855 Lakewood Blvd.
Long Beach, CA 90846

McGraw-Edison Co.
Edison Electronics
4421 Rice St.
Chicago, IL 60651

Electronics Division
333 W. River Rd.
Elgin, IL 60120

Michigan Chemical Corp.
Technical Center
1975 Green Rd.
Ann Arbor, MI 48105

Minnesota Mining and Manufacturing Co.
Fire Protection Systems Dept.
3M Center Building 236-1
St. Paul, MN 55101

Mission Research Corp.
Civil Analysis Group
P.O. Drawer 719
735 State St.
Santa Barbara, CA 93102

Monsanto Co.
800 N. Lindbergh Blvd.
St. Louis, MO 63166

National Smoke, Fire, and Burn
Institute, Inc.
53 State St.
Boston, MA 02109

PPG Industries, Inc.
Resin Products Technical Center
P.O. Box 127
Springdale, PA 15144

Petrolite Corporation
Tretolite Division Research
369 Marshall Ave.
St. Louis, MO 63119

Phoenix Chemical Laboratory, Inc.
3953 W. Shakespeare Ave.
Chicago, IL 60647

Portland Cement Assn.
Research and Development
Construction and Technology Laboratories
5420 Old Orchard Rd.
Skokie, IL 60076

The Rand Corp.
1700 Main St.
Santa Monica, CA 90406
New York City Rand Institute (now closed)

Raybestos Manhattan Industrial
Products Co.
P.O. Box 5205
Garco and O'Hear Sts.
North Charleston, SC 29406

Research Triangle Institute
Center for Population
and Urban-Rural Studies
P.O. Box 12194
Research Triangle Park, NC 27709

Sandia National Laboratory
P.O. Box 5800
Albuquerque, NM 87185

Science Applications, Inc.
1257 Tasman Dr.
Sunnyvale, CA 94086

Scientific Service, Inc.
1536 Maple St.
Redwood City, CA 94063

Southwest Research Institute
P.O. Drawer 28510
San Antonio, TX 78284

Standard Oil Company of Indiana
Amoco Oil Company Research and Development
Amoco Research Center
P.O. Box 400
Naperville, IL 60540

Technical Fire Investigation Services
3109 B NE 59th St.
Vancouver, WA 98663

Textile Research Institute
Princeton, NJ 08540

TRW Systems Group
Engineering Sciences Laboratory
1 Space Park
Redondo Beach, CA 90278

Underwriters Laboratories Inc.
207 E. Ohio St.
Chicago, IL 60611
1285 Walt Whitman Rd.
Melville, NY 11746

Union Carbide Corp.
Safety Research Laboratory
270 Park Ave.
New York, NY 10017

United States Borax and Chemical Corp.
U.S. Borax Research Corp.
412 Crescent Way
Anaheim, CA 90010

United States Testing Co., Inc.
Biological Services Division
1415 Park Ave.
Hoboken, NJ 07030

University Engineers, Inc.
1215 Westheimer Dr.
Norman, OK 73069

Foreign Laboratories

Governmental

Department of Construction
Experimental Building Station
P.O. Box 30
Chatswood, New South Wales
AUSTRALIA 2067

Department of the Environment
Forest Fire Research Institute
240 Bank Street
Ottawa, Ontario
CANADA

Department of the Environment
Great Lakes Forest Research Centre
1219 Queen Street East
P.O. Box 490
Sault Ste. Marie, Ontario
CANADA P6A 5M7

Department of the Environment
Northern Forest Research Centre
Edmonton, Alberta
CANADA

National Research Council of Canada
Fire Research Section
Division of Building Research
Ottawa, Ontario
CANADA K1A OR6

Kobenhavns Brandvaesen
(Copenhagen Fire Department)
Kobenhavns Brandvaesens Laboratorium
og Tekniske Bibliotek
H. C. Andersens Boulevard 23
DK 1553
Kobenhanv V.
DENMARK

Home Office
United Kingdom
Science Advisory Branch
Fire Research Division
Horseferry House
Dean Ryle Street
London SW1P 2AW
ENGLAND

Department of the Environment
Building Research Establishment
Fire Research Station
Melrose Avenue
Borehamwood, Hertfordshire, WD6 2BL
ENGLAND

Centre National de Prevention
et de Protection Station d'Essais
et Laboratoire du Feu
Route de Noisy-le-Grand
77 Champs-sur-Marne
FRANCE

Centre National de la
Recherche Scientifique (C.N.R.S.)
Centre de Recherche sur la Chimie
de la Combustion et les Hautes Temperatures
45045 Orleans
FRANCE

Centre National de la
Recherche Scientifique (C.N.R.S.)
Service d'Analyse des Gaz
4, Avenue de l'Observatoire
75270 Paris Cedex 06
FRANCE

Centre National de la
Recherche Scientifique (C.N.R.S.)
Laboratoire d'Energetique et de Detonique,
E.N.S.M.A.
Rue Guillaume VII
86034 Poitiers Cedex
FRANCE

Centre Scientifique et Technique
du Batiment
4, Avenue du Recteur-Poincare
75782 Paris Cedex 16
FRANCE

Centre Technique du Bois (CIB)
Laboratoire du Feu
10, Avenue de Saint Mande
75012 Paris
FRANCE

Ministere de l'Interieur
Direction de la Securite Civile
18 Rue Ernest Cognacq
92300 Levallois-Perret
FRANCE

Physikalisch-Technische Bundesanstalt
Bundsallee 100
3300 Braunschweig
FEDERAL REPUBLIC OF GERMANY

Building Research Institute
Ministry of Construction
Organic Section
Materials Division
3-Chome Hyakunin-cho
Shinjuku-ku
JAPAN

Ministry of Home Affairs
Fire Defense Agency
Fire Research Institute
14-1, Nakahara 3 Chome
Mitaka, Tokyo
JAPAN

Diputacion Provincial de Barcelona
Laboratorio General de Ensayos e Investigaciones
Departmento de Ignifugacion
c/. Urgel 187, Barcelona-11
SPAIN

Laboratorio del Fuego de Barcelona
Cuerpo de Bomberos del Ayuntamiento de Barcelona
c/. Lerida, No. 30, Barcelona
SPAIN

National Board of Rescue
and Fire Services
Analytical Department
Arrhenius Laboratory
University of Stockholm
Box 6029
S-102 31 Stockholm
SWEDEN

National Defense Research Institute
P.O. Box
S-104 50 Stockholm 80
SWEDEN

Research Institute for
Protective Construction
Auf der Mauer 2
CH-8001 Zurich
SWITZERLAND

Swiss Federal Laboratory for
Materials Testing and Research (EMPA)
Uberlandstrasse 129
CH-8600 Dubendorf
SWITZERLAND

Zurich City Police
Scientific Service
Zeughausstrasse 11
8004 Zurich
SWITZERLAND

Universities

Monash University
Geophysical Fluid Dynamics Laboratory
Clayton, Victoria 3168
AUSTRALIA

State University of Ghent
Laboratory for Fuel Technology and Heat Transfer
St. Pietersnieuwstraat, 25
(B) 9000 Ghent
BELGIUM

Queen's University
Kingston, Ontario
CANADA

University of Waterloo
Mechanical Engineering Department
Waterloo, Ontario
CANADA N2L 3G1

King's College London
Department of Civil Engineering
Strand, London WC2R 2LS
ENGLAND

Sheffield University
Department of Chemical Engineering
and Fuel Technology
Sheffield S1 3JD
ENGLAND

University of Southampton
Department of Aeronautics
and Astronautics
Southampton S09 5NH
ENGLAND

Universite de Paris-Sud
Laboratoire de Toxicologie
Faculte de Pharmacie
Rue J. B. Clement
92290 Chatenay-Malabry
FRANCE

Technischen Universitat Braunschweig
Institut fur Baustoffkunde und Stahlbetonbau
Beethovenstrasse 52
D 3300 Braunschweig
FEDERAL REPUBLIC OF GERMANY

Gesamthochschule Duisburg
Forschungsgruppe Automatische Brandentoleckung
GH-Duisberg FB9
Bismarckstrasse 81
D-41 Duisburg
FEDERAL REPUBLIC OF GERMANY

Universitat Karlsruhe (T.H.)
Forschungsstelle fur Brandschutztechnik
Hertzstrasse 16
D-7500 Karlsruhe 21
FEDERAL REPUBLIC OF GERMANY

Institut fur Holzforschung der Universitat Munchen
Brandlabor, Winzerstrasse 45
D 8000 Munchen 40
FEDERAL REPUBLIC OF GERMANY

Universitat Stuttgart
Abteilung Brandverhalten und Brandschutz
Otto-Graf-Institut
Pfaffenwaldring 4
D 700 Stuttgart 80
FEDERAL REPUBLIC OF GERMANY

University of Edinburgh
Department of Fire Safety Engineering
King's Buildings
Mayfield Road
Edinburgh EH9 3JL
SCOTLAND

Chalmers University of Technology
Division of Building Construction
Fack, S-402 20 Goteborg 5
SWEDEN

Private and Industrial Laboratories

Versuchs- und Forschungsanstalt der Stadt Wien
Rinnbockstrasse 15
1110 Wien
AUSTRIA

Fulmer Research Institute, Ltd.
Yarsley Testing Laboratories
The Street
Ashtead, Surrey
ENGLAND

QMC Industrial Research, Ltd.
229 Mile End Road
London E1 4AA
ENGLAND

Shell International Petroleum Co., Ltd.
Shell Research Ltd.
Thornton Research Centre
P.O. Box 1
Chester CH1 3SH
ENGLAND

Timber Research and Development Association
Wood Technology Department
TRADA House
Stocking Lane
Hughenden Valley
High Wycombe, Buckinghamshire
ENGLAND

Wilkinson Match Ltd.
(Graviner Ltd.)
Safety and Protection Division
448 Bassingstoke Road
Reading, Berkshire, RG2 OQD
ENGLAND
Research Division
Poyle Road
Colnbrook, Slough SL3 OHA
ENGLAND

Federation Nationale du Batiment
Union Technique Interprofessionnelle
COSTIC
9 Rue Laperause
75016 Paris
FRANCE

Allianz Versicherungs-AG
Allianz-Zentrum fur Technik GmBH
Krausstrasse 14, 8045 Ismaning
FEDERAL REPUBLIC OF GERMANY

Bergbau-Forschung GmBH
Forschungsinstitut des Steinkohlenbergbauvereins
Hauptstelle fur das Grubenrettungswesen
Schonscheidtstrasse 28
4300 Essen 13 (Kray)
FEDERAL REPUBLIC OF GERMANY

Institut fur Bautechnik
Reichpietschufer 72-76
1000 Berlin 30
FEDERAL REPUBLIC OF GERMANY

Institute for Damage Prevention and Damage Research
e. V., Gartenstrasse 4-10
23 Kiel I
FEDERAL REPUBLIC OF GERMANY

Registro Italiano Navale
Laboratorio Studi Antincendio
Via Corsica 12
16128 Genova
ITALY

Japan Fire Equipment Inspection Corporation
14-1, 3-Chome, Nakahara
Mitaka-shi, Tokyo, 181
JAPAN

Kokusai Gijutsu Kaihatsu Company, Ltd.
2-4-1 Amanuma Suginami
Tokyo, 167
JAPAN

Veg-Gasinstituut n.v.
Wilmersdorf 50
Apeldoorn
THE NETHERLANDS

Swedish Forest Products Research Laboratory
Fiber Building Board Department
Box 5604
S-114 86 Stockholm
SWEDEN

Swedish Institute of Steel Construction
Drottning Kristinas vag 48
S-114 28 Stockholm
SWEDEN

Brand-Verhutungs-Dienst
Nuschelerstrasse 45
8001 Zurich
SWITZERLAND

Cerberus, Ltd.
Fire Division Research and Development
CH-8707
Mannedorf
SWITZERLAND

Swiss Fire Brigade Association
Ensingerstrasse 37
CH-3000
Bern 16
SWITZERLAND

Swiss Reinsurance Company
Division of Fire Protection Engineering
P.O. Box 172 CH-8022
Zurich
SWITZERLAND

Accredited Testing Laboratories

For many years, the phrase "a nationally recognized testing laboratory" was used somewhat indiscriminately to call attention to the sources for testing of products and assemblies to determine if they met performance (and sometimes specification) requirements of fire protection standards. Thus, a standard user would be directed to use only products and assemblies that had been "listed" or "approved" by a nationally recognized testing laboratory if compliance with certain provisions of the standard in question was the goal. Unfortunately, there was always a gnawing doubt about what exactly was a "nationally recognized testing laboratory"; thus, the phrase has been dropped from NFPA published documents.

An effort to bring order to the question of identifying technically competent testing laboratories in a consistent and uniform fashion has been established within the framework of the U.S. Department of Commerce (DOC). It is the National Voluntary Laboratory Accreditation Program (NVLAP) established in 1976 with the goal "to serve on a timely basis the needs of industry, consumers, the government, and others by accrediting the nation's testing laboratories." In the context of U.S. standardization activities, NVLAP fits between standards development and promulgation on the one hand and activities related to product assurance and certification on the other.

The first accreditations under the NVLAP program were announced in October 1979. In that announcement, a total of 30 laboratories representing 20 organizations were accredited for certain test methods, including a fire test for thermal insulation materials. Among the laboratories receiving the accreditation were Underwriters Laboratories, Inc. and Factory Mutual Research Corp., two organizations with historical preeminence in the fire testing field.

Accreditation of a laboratory is based on criteria that generally focus on a laboratory's overall operation, including organization and technical direction, ethical and professional business practices, and the quality control system used by the laboratory. Other more specific criteria focus on the personnel, equipment, facility, procedures and recordkeeping for performing and reporting test results.

To gain accreditation, an organization must submit a request for an application in an established laboratory accreditation program (LAP) to the DOC through its Office of Products Standard Policy (OPSP) which forwards it to the Office of Testing Laboratory Evaluation Technology of the National Bureau of Standards (NBS). The NBS makes an assessment of the laboratory's performance using the general and specific criteria mentioned earlier, on the basis of (1) written information submitted with the original request, (2) an on-site examination, and (3) results of proficiency testing that may be required. Based on the technical assessments, NBS recommends either granting or denying accreditation to OPSP, which then makes the final decision.

If accredited, a certificate of accreditation is sent to the laboratory along with a list of specific test methods for which accreditation is granted. It takes about eight months to establish accreditation for a laboratory (about two years if a new LAP in a new product area has to be established). The procedures contain provisions for periodic re-accreditation.

LAP Status

By the middle of 1983 there were five established LAPs:

1. *Insulation LAP* The Insulation LAP for thermal insulation materials with 63 test methods for which accreditation may be granted. Thirty-three laboratories are currently accredited to perform one or more of these test methods.
2. *Concrete LAP* The Concrete LAP for freshly mixed field concrete has two groups of test methods and one optional test method for which accreditation can be granted. Forty-seven laboratories are currently accredited under the Concrete LAP.
3. *Carpet LAP* The Carpet LAP for carpet has 12 test methods for which accreditation may be granted. Twenty-three laboratories are currently accredited for one or more of these test methods.
4. *Stove LAP* The Stove LAP for solid fuel room heaters has 21 test methods in three categories for which accreditation may be granted. Six laboratories are currently accredited for one or more of these test methods.
5. *Acoustics LAP* The Acoustic LAP for acoustical testing services has 49 test methods for which accreditation may be granted. Six laboratories are currently accredited for one or more of these test methods.

LAPs Under Development or Being Considered

1. *Dosimetry LAP* Comments have been received from the industry overview committee on the draft LAP Handbook. Responses to the request for proposal (RFP) for procuring the services of a testing laboratory have been received and are being evaluated. An award is expected to be made during the second quarter of 1983. Fifty-one persons have indicated interest in serving as technical experts, and evaluation of these is presently in progress. NBS expects to announce the formal extablishment of this LAP during the second quarter of 1983.
2. *Electromagnetic Calibration Services LAP* A draft LAP Handbook is expected to be ready during the third quarter of 1983. Final details for the proficiency testing and the relationship of a Measurement Assurance Program are still being developed.
3. *Paper, Paint and Mattresses LAP* In May 1983, NBS announced a program related to development of a preliminary finding of need to accredit testing laboratories that test government procured commercial items (paper, paint and mattresses). Public comments were invited. Upon receipt of comments an evaluation would be undertaken. Following evaluation a notice would be published in the *Federal Register* announcing a final finding of need or a withdrawal of the preliminary finding of need.
4. *Microforms LAP* Also in May 1983, NBS announced a program related to the development of a preliminary finding of need to accredit testing laboratories that test microforms (microfilm, microfiche, aperture cards). The preliminary finding of need would include consideration of how accreditation of laboratories that test microforms would benefit the public interest. Public comments were limited. An evaluation, as described above for the Paper LAP, will be undertaken.
5. *Windows and Doors LAP* The development of a preliminary finding of need for a Windows and Doors LAP was described in the 1983 edition of the *Fire Almanac*. Following analysis of public comments, NBS withdrew the finding of need to accredit laboratories that test window and door products. The withdrawal is based, in part, on the decision of the Architectural Aluminum Manufacturers Association to establish a private industry-sponsored laboratory accreditation program for such laboratories.

Directory of NVLAP Accredited Laboratories

The U.S. Department of Commerce, National Bureau of Standards, National Voluntary Laboratory Accreditation Program publication: NVLAP, Fifth Annual Report and Directory of Accredited Laboratories (NBS Special Publication 636, issued September 1982), and related updates printed in the *Federal Register* provide an up-to-date listing of the NVLAP accredited laboratories.

A typical listing, as reprinted below for Factory Mutual Research Corp., includes the test methods for which the laboratory is accredited.

Factory Mutual Research Corp., Attn: William F. Maroni, 1151 Boston-Providence Turnpike, Norwood, MA 02062, Phone: (617) 762-4300.

WE WANT TO KNOW . . .

if a name, an address, or a phone number has changed; if there's an upcoming event, a new program or course, a new publication being offered. If you have more current information than is contained in this *Almanac*, know something that should be included in this book, or just have something interesting about the fire protection scene that you want to contribute, please let us know. Write: Editor, *Fire Almanac*, NFPA, Batterymarch Park, Quincy, MA 02269. All suggestions will receive our careful attention.

NVLAP Code	Test Method Designation	Short Title (property) Subtitle (if applicable)
01/CO2	HH-I-515 (para. 4.8.5 in D version, Amendment 1)	Corrosiveness; Cellulosic fiber (loose-fill)
01/D25	HH-I-515 (para. 4.8.3 in D version, Amendment 1)	Moisture absorption; Cellulosic fiber (loose-fill)
01/D26	HH-I-515 (para. 4.8.1 in D version, Amendment 1)	Settled density; Cellulosic fiber (loose-fill)
01/FO2	ASTM E84	Surface burning characteristics; Building materials
01/FO7	HH-I-515 (para. 4.8.7 in D version, Amendment 1)	Critical radiant flux; Radiant Panel (cellulosic fiber, loose-fill)
01/FO8	HH-I-515 (para. 4.8.8 in D version, Amendment 1)	Smoldering combustion; Cellulosic fiber (loose-fill)
01/VO6	HH-I-515 (para. 4.8.9 in D version, Amendment 1)	Starch; Cellulosic fiber (loose-fill)
03/FO1	ASTM E84	Surface flammability (Carpet)
03/FO4	ASTM E648	Radiant Panel (Carpet)

Alphabetical Listing of Accredited Laboratories

The Alphabetical Listing of Accredited Laboratories with LAP(s) under which one or more test methods have been accredited (updated through June 1983).

KEY:
(1) INSULATION LAP
(2) CONCRETE LAP
(3) CARPET LAP
(4) STOVE LAP
(5) ACOUSTICS LAP

(2) A & H/Flood Engineering
Attn: Paul E. Flood
4421 Harrison St.
Hillside, IL 60162
(312) 449-0500

(2) Aguirre Engineers, Inc.
Attn: Vukoslav E. Aguirre
Englewood, CO 80155
(303) 694-2277

(3) American Carpet Laboratories, Inc.
Attn: Michael D. Connell
P.O. Box 357
111 W. Nashville St.
Ringgold, GA 30736
(404) 935-5672

(2) American Testing Laboratories, Inc.
Attn: John S. Kassees
784 Flory Mill Rd.
Box 4014
Lancaster, PA 17604
(717) 569-0488

(1) Apache Building Products Company
Attn: Dennis W. Rosato
2025 East Linden Ave.
Linden, NJ 07036
(201) 486-6723

(2) Arizona Sand and Rock Company
Attn: Roy Stegall
1801 E. University Dr.
P.O. Box 20067
Phoenix, AZ 85036
(602) 254-8465

(4) Arnold Greene Testing Laboratories, Inc.
Attn: Robert J. Halliday
2 Millbury St.
Auburn, MA 01501
(617) 235-7330

(2) The Arundel Corporation
Greenspring Laboratory
Attn: David Wherley
6806 Greenspring Ave.
Baltimore, MD 21209
(301) 296-6400

(3) Associated Testing Laboratories
Attn: George J. Murphy
23 Vincent St.
Wayne, NJ 07470
(201) 628-1363

(2) Atlantic Testing Laboratories, Ltd.
Cicero Division
Attn: Marcus Rotundo
P.O. Box 356
Cicero, NY 13039
(315) 699-5281

(3) Bigelow-Sanford, Inc.
Georgia Rug Mill
Attn: Van A. Pullen
Lyerly St.
Summerville, GA 30747
(404) 857-2421

(3) Bigelow-Sanford, Inc.
Technical Services
Attn: Hamir D. Merchant
P.O. Box 3089
Greenville, SC 29602
(803) 299-2630

(1) Butler Manufacturing Company
Research Center
Attn: Marvin K. Snyder
135th St. and Botts Rd.
Grandview, MO 64030
(816) 763-3022

(3) C.H. Masland and Sons
Attn: David A Boyles
P.O. Box 40
Carlisle, PA 17013
(717) 249-1866

(2) Capitol Cement
Attn: Thomas L. Vick
11551 Nacogdouches Rd.
P.O. Drawer 33240
San Antonio, TX 78233
(512) 655-3010

(2) Central Ready-Mixed Concrete
Research & Technical Center
Attn: Christine B. Anderson
4350 South 13th St.
Milwaukee, WI 53221
(414) 282-4200

(1) Certainteed Corporation
Insulation Group
Research & Development Laboratory
Attn: W. Francis Olix
1400 Union Meeting Rd.
Blue Bell, PA 19422
(215) 542-0500

(3) Certified Testing Laboratories, Inc.
Attn: John H. Frank
1105 Riverbend Dr.
P.O. Box 2041
Dalton, GA 30720
(404) 226-1400

(3) Chisholm Trail Testing and Engineering Company, Inc.
Attn: James F. Rosendahl
302 South Miller St.
Decatur, TX 76234
(817) 627-5216

(1) & (3) Commercial Testing Company, Inc.
Attn: Jonathan Jackson
1215 South Hamilton St.
P.O. Box 985
Dalton, GA 30720
(404) 278-3935

(2) Conrock Co.
Testing Laboratory
Attn: Robert W. Floyd
P.O. Box 2950
Terminal Annex
Los Angeles, CA 90051
(213) 258-2777

(2) Construction Technology Lab
A Division of Portland Cement Assn.
Attn: T. J. Rowe
5420 Old Orchard Rd.
Skokie, IL 60077
(312) 966-6200

(2) Contractors Supply Corporation of West Virginia, Inc.
Attn: Anthony A. Gulo
24th and Water Sts.
P.O. Box 6587
Wheeling, WV 26003
(304) 232-1048

(3) Coronet Carpets, Inc.
Attn: Winfred L. Jones
Cleveland Dr.
P.O. Box 1248
Dalton, GA 30720
(404) 259-4511

(1) Dow Chemical USA, Foam Product Research
Product Evaluation
Attn: Dale E. Keller
P.O. Box 515
Granville, OH 43023
(614) 587-4313

(1) Dynatech R/D Company
Thermophysics Laboratory
Attn: Andre O. Desjarlais
99 Erie St.
Cambridge, MA 02139
(617) 868-8050

(2) Eastcoast Testing & Engineering, Inc.
Attn: Craig Smith
430 NW Flagler Dr.
Ft. Lauderdale, FL 33301
(305) 523-4244

(3) E & B Carpet Mills, Inc.
Attn: Robert H. Davis
1020 Riverbend Dr.
Dalton, GA 30720
(404) 278-3197

(4) Energy Systems, Inc.
Attn: Neil Tyson
1705 Pumphrey Ave.
Auburn, AL 36830
(205) 821-9400

(4) Energy Testing Laboratory of Maine
Attn: J. Douglas Brownrigg
Southern Maine Vocational Technical Institute
Fort Rd.
South Portland, ME 04106
(207) 799-7303

(2) Engineering Testing Laboratory, City of Akron
Attn: Thomas H. Butler
1420 Triplett Blvd. - Bldg. #2
Akron, OH 44306
(216) 375-2861

(1) & (3) Factory Mutual Research Corp.
Attn: William F. Maroni
1151 Boston-Providence Turnpike
Norwood, MA 02062
(617) 762-4300

(2) Fox & Associates of Arizona, Inc.
Attn: Ronald L. Pruett
3301 East Madison St.
Phoenix, AZ 85034
(602) 244-8197

(3) Galaxy Carpets Inc., Testing Laboratory
Attn: Lou Childers
Industrial Blvd.
P.O. Box 800
Chatsworth, GA 30705
(404) 695-9611

(2) Garco Testing Laboratories
Attn: Douglas L. Watson
41 West Central Ave.
P.O. Box 7006
Salt Lake City, UT 84107
(801) 266-4498

(2) General Testing Laboratories, Inc.
Attn: Lawrence Poisner
1517 Walnut St.
Kansas City, MO 64108
(816) 471-1205

(2) Genstar Stone Products Co.
Quality Control Laboratory
Attn: Robert L. Chester
10300 Pulaski Highway
White Marsh, MD 21162
(301) 628-4000

(1) Geoscience Ltd.
Attn: Heinz F. Poppendiek
410 S. Cedros Ave.
Solana Beach, CA 92075
(714) 755-9396

(5) Gold Bond Building Products
A National Gypsum Division, Research Center
Attn: Joseph Volk
1650 Military Rd.
Buffalo, NY 14217
(716) 873-9750

(2) Gulf Coast Testing Laboratory
Attn: Doyne Reynolds
1205 North Tancahua St.
P.O. Box 1148
Corpus Christi, TX 78403
(512) 882-5411

(2) The H.C. Nutting Company
Attn: James T. Larbes
4120 Airport Rd.
Cincinnati, OH 45226
(513) 321-5816

(2) Hales Testing Laboratory, Inc.
Attn: George H. Speers
23286 Foley St.
P.O. Box 6124
Hayward, CA 94540
(415) 887-1430

(1) & (3) Hardwood Plywood Manufacturers Association
Attn: William J. Groah
1825 Michael Faraday Dr.
P.O. Box 2789
Reston, VA 22090
(703) 435-2900

(2) Herron Consultants, Inc.
Attn: Jon Hugh Peterson
5555 Canal Rd.
Cleveland, OH 44125
(216) 447-1335

(3) Independent Textile Testing Service, Inc.
Attn: Cornelius C. Setter
1499 Murray Ave.
P.O. Box 1948
Dalton, GA 30720
(404) 278-3013

(1) Insta-Foam Products, Inc.
Attn: Joseph John Elsey
1500 Cedarwood Dr.
Joliet, IL 60435
(815) 741-6851

(1) Intest Laboratories, Inc.
Attn: Donald L. Valsvik
2820 Anthony Lane South
Minneapolis, MN 55418
(612) 781-2603

(1) & (5) Jim Walter Research Corporation
Attn: Alan P. Conroy
10301 9th St. North
St. Petersburg, FL 33702
(813) 576-4171

(2) Kelso Industries, Inc.
Quality Control Laboratory
Attn: Chris G. Slate
7002 Industrial Blvd.
P.O. Box 659
Galveston, TX 77553
(713) 744-5341

(1) Lander Thermal Conductivity Laboratory
Attn: R.M. Lander
1320 West 28th St.
Minneapolis, MN 55408
(612) 872-7230

(2) Lincoln-Devore Testing Laboratory, Inc.
Attn: George D. Morris
1000 West Fillmore St.
Colorado Springs, CO 80907
(303) 632-3595

(1) Louisiana-Pacific Corporation
Pabco R & D Laboratory
Attn: F.B. Hutto, Jr.
1110 16th Rd.
Fruita, CO 81521
(303) 858-3694

(1) & (5) Manville Corporation
R & D Center
Attn: Joseph P. Ferraro
P.O. Box 5108
Denver, CO 80217
(303) 978-5553

(2) Materials Service Corporation
Quality Control
Attn: John Albinger
300 West Washington St.
Chicago, IL 60606
(312) 372-3600

(1) NAHB Research Foundation, Inc.
Attn: Hugh Angleton
627 Southlawn Lane
P.O. Box 1627
Rockville, MD 20850
(301) 762-4200

(2) Northern Testing Laboratories, Inc.
Billings Area Laboratory
Attn: Larry O'Dell
P.O. Box 30615
Billings, MT 59107
(406) 248-9161

(2) Northern Testing Laboratories, Inc.
Boise Area Laboratory
Attn: Roger W. Pocta
P.O. Box 7867
Boise, ID 83707
(208) 377-2100

(2) Northern Testing Laboratories, Inc.
Great Falls Area Laboratory
Attn: Jerry A. Peterson
P.O. Box 951
Great Falls, MT 59403
(406) 453-1641

(1) Olin Corporation
Physical Testing Laboratory
Attn: D. Robert Shine
275 Winchester Ave. Bldg. 117C
P.O. Box 30-275
New Haven, CT 06511
(203) 789-5892

(1) & (5) Owens-Corning Fiberglas Corp.
Technical Center Laboratory
Attn: William M. Edmunds
Route 16, P.O. Box 415
Granville, OH 43023
(614) 587-7024

(1) Owens-Corning Fiberglas Corp.
Barrington, New Jersey Plant Laboratory
Attn: Andrew Green
Davis & Shreeve Rds.
Barrington, NJ 08007
(609) 547-9200

(1) Owens-Corning Fiberglas Corp.
Delmar, New York Plant Laboratory
Attn: Mark P. Arnold
Rte 32, Feura Bush Rd.
Delmar, NY 12054
(518) 439-9341

(1) Owens-Corning Fiberglas Corp.
Fairburn, Georgia Plant Laboratory
Attn: Larry Maynard
700 McLaren Rd.
Fairburn, GA 30213
(404) 964-9811

(1) Owens-Corning Fiberglas Corp.
Kansas City, Kansas Plant Laboratory
Attn: Glen McCoy
300 Sunshine Rd.
P.O. Box 15139
Kansas City, KS 66115
(913) 281-2811

(1) Owens-Corning Fiberglas Corp.
Newark, Ohio Plant Laboratory
Attn: P.D. Shull
Case Ave.
Newark, OH 43055
(614) 345-3441

(1) Owens-Corning Fiberglas Corp.
Santa Clara, California Plant Laboratory
Attn: Monte Schenkin
960 Central X-Way
P.O. Box 89
Santa Clara, CA 95052
(408) 727-3535

(1) Owens-Corning Fiberglas Corp.
Waxahachie, Texas Plant Laboratory
Attn: Mark Kwasowski
Interstate 35 East
Waxahachie, TX 75165
(214) 937-1340

(2) Parratt-Wolff, Inc.
Attn: Bruce L. Higgins
Fisher Rd.
East Syracuse, NY 13057
(315) 437-1429

(4) PFS Corporation
Attn: Ed Starostovic
2402 Daniels St.
Madison, WI 53704
(608) 221-3361

(2) Pittsburgh Testing Laboratory
Attn: William H. Levelius
850 Poplar St.
Pittsburgh, PA 15220
(412) 922-4000

(2) Quikrete Technical Center
Attn: Thomas E. Pecuil
2250 Stephenson Rd.
Lithonia, GA 30058
(404) 482-7264

(2) R.W. Sidley, Inc.
Sidley Quality Control Laboratory
Attn: Lawrence McCune
6900 Madison Rd.
Thompson, OH 44086
(216) 298-3232

(5) Riverbank Acoustical Laboratory of IITRI
Attn: Owen J. Viergutz
1512 Batavia Ave.
P.O. Box 189
Geneva, IL 60134
(312) 567-4703

(3) Salem Carpet Laboratory
Attn: Michael A. Corbin
225 South
P.O. Box 160
Chatsworth, GA 30705
(404) 695-4663

(3) Shaw Industries, Inc.
Attn: Carey Mitchell
Plant #4, S. Hamilton St. Ext.
P.O. Drawer 2128
Dalton, GA 30720
(404) 278-3812

(2) Smith-Emery Company
Attn: George E. Battey, Jr.
781 East Washington Blvd.
Los Angeles, CA 90021
(213) 749-3411

(3) Southwest Research Institute
Department of Fire Technology
Attn: Carl A. Hafer
6220 Culebra Rd.
San Antonio, TX 78284
(512) 684-5111

(1) Sparrell Engineering Research Corp.
Attn: James K. Sparrell
Bristol Rd.
P.O. Box 130
Damariscotta, ME 04543
(207) 563-3224

(2) Standard Testing and Engineering Company
Attn: Daniel B. Hapke
3400 Lincoln Blvd.
Oklahoma, OK 73105
(405) 528-0541

(?) Stratton Laboratories
Attn: Jack R. Kilgore
Highway 61 South
P.O. Box 1007
Cartersville, GA 30120
(404) 382-9350

(2) STS Consultants Ltd.
Northbrook, Illinois Office
Attn: Michael T. Russell
111 Pfingsten Rd.
Northbrook, IL 60062
(312) 272-6520

(2) STS Consultants Ltd.
Raleigh, North Carolina Office
Attn: Barney Hale
P.O. Box 12015
Research Triangle Park, NC 27709
(919) 787-5124

(2) The Tanner Companies
United Metro Division Laboratory
Attn: Harold J. Wright
3240 South 19th Ave.
Phoenix, AZ 85036
(602) 262-1323

(2) Testing Engineers, Inc.
Oakland Division
Attn: Clifford N. Craig
2811 Adeline St.
P.O. Box 24075
Oakland, CA 94623
(415) 835-3142

(2) Testing Engineers, Inc.
Santa Clara Division
Attn: Lee W. Mattis
401 Aldo Ave.
Santa Clara, CA 95050
(408) 988-8888

(2) Texas Testing Laboratories, Inc.
Attn: Robert L. Henry
1526 South Good-Latimer Exp.
P.O. Box 2144
Dallas, TX 75221
(214) 428-7481

(1) & (2) Twin City Testing and Engineering Laboratory, Inc.
Attn: Richard Stehly
662 Cromwell Ave.
St. Paul, MN 55114
(612) 645-3601

(1), (3) & (4) Underwriters Laboratories, Inc.
Northbrook, IL
Attn: Steve Mazzoni
333 Pfingsten Rd.
Northbrook, IL 60062
(312) 272-8800

(1) & (4) Underwriters Laboratories, Inc.
Santa Clara, California Laboratory
Attn: Steven Roll
1655 Scott Blvd.

Santa Clara, CA 95050
(408) 985-2400

(2) Union Rock and Materials Corp.
Attn: Howard B. Pugh, Sr.
2800 Central Ave,
P.O. Box 8007
Phoenix, AZ 85066
(602) 276-4211

(1) United States Gypsum Company
Attn: William Porter
700 N. U.S. Highway 45
Libertyville, IL 60048
(312) 362-9797

(1) & (3) United States Testing Company, Inc.
Hoboken, New Jersey Laboratory
Attn: Carl B. Yoder
1415 Park Ave.
Hoboken, NJ 07030
(201) 792-2400

(1) & (3) United States Testing Company, Inc.
California Division
Attn: Bernd Givon
5555 Telegraph Rd.
Los Angeles, CA 90040
(213) 723-7181

(1) United States Testing Company, Inc.
Tulsa Division
Attn: Fred D. Wampnar
1341 North 108th East Ave.
Tulsa, OK 74116
(918) 437-8333

(2) Virginia Concrete Laboratory
Attn: Richard A. Buckelew
Box 666
Springfield, VA 22150
(703) 354-6111

(2) W.R. Grace & Company
Construction Products Division Laboratory
Attn: Forrest R. Hurley
62 Whittemore Ave.
Cambridge, MA 02140
(617) 876-1400

(2) The Walt Keeler Company, Inc.
Attn: Kelly B. Callison
826 East Lincoln St.
P.O. Box 197
Wichita, KS 67201
(316) 265-0615

(3) Walter Carpets, West Point Pepperell
Attn: Xavier Castro
14641 East Don Julian Rd.
P.O. Box 1252
City of Industry, CA 91749
(213) 968-1464

(2) West Virginia Department of Highways
Materials Control, Soil and Testing Division
Attn: Thomas M. Dugan
312 Michigan Ave.
Charleston, WV 25311
(304) 348-3160

(2) Western Technologies, Inc.
Attn: Craig Wiedeman
3737 East Broadway Rd.
P.O. Box 21387
Phoenix, AZ 85036
(602) 268-1381

(1) Wiss, Janney, Elstner and Associates, Inc.
Attn: Jerry G. Stockbridge
330 Pfingsten Rd.
Northbrook, IL 60062
(312) 272-7400

(3) World Carpets, Inc.
Attn: Wayne Murdock
One World Plaza
Dalton, GA 30720
(404) 278-8000

For further information contact: Mr. John W. Locke, Manager, Laboratory Accreditation, National Bureau of Standards, TECH B141, Washington, DC 20234, (301) 921-3431. Those interested in using the services of a NVLAP accredited laboratory may obtain the latest copy of the list of test methods for which it is accredited either from the individual laboratory itself, or from the Manager, Laboratory Accreditation. Also available from the Manager, Laboratory Accreditation is a complete listing of NVLAP accredited laboratories with a corresponding list of the test methods for which they are accredited.

History of Development of Extinguishing Systems

1723	The first automatic fire extinguisher of record patented in England by Ambrose Godfrey, a celebrated chemist. It consisted of a cask of fire-extinguishing liquid containing a pewter chamber of gunpowder. This was connected with a system of fuses which were ignited, exploding the gunpowder and scattering the solution.
1806	First automatic device using water through a system of pipes invented by John Carey. It consisted of a number of rose or perforated sprinklers connected to pipes supplied with water from an elevated tank. There was a valve in the main pipe normally closed but connected to a system of cords and weights in such a manner that if the cord were burned, the valve would be opened by a counterweight.
1809	Sir William Congreve, a hydraulic engineer and member of Parliament, patented a sprinkler system consisting of rose sprinklers with combustible cords. These cords led to valves in a place of "outside security and arrangements for a further supply of water by water mains or hose connections to fire engines." In 1812, he substituted for burning cords a cement fusible at 110°F or less. The patent described an automatic sprinkler as "an apparatus for extinguishing fires which shall be called into action by the fire itself at its first breaking out and which shall be brought to bear upon the precise part where the flames exist." This patent included an alarm attachment operated by the dropping of a weight.
1852	William Macbay patented a device which resembled the automatic sprinkler. It consisted of a system of piping having outlets closed by caps of fusible metal, gutta percha or other substances that would melt at a low temperature.
1852	First perforated pipe water extinguishing system in US installed in a textile mill in Lowell, MA. It protected roofs of the mill buildings only. Idea imported from England.
1860	The Francis System of perforated pipe developed by James B. Francis. Piping was placed close to ceiling, running across the mill on the center of each bay. Pipe perforated with holes 1/10 inch in diameter, placed 9 inches apart alternately on different sides and at a point a little above the horizontal center of the pipe. This caused the water to be discharged toward the ceiling at an angle which would wet the ceiling to advantage as well as properly cover the floor below.
1861	One of the first attempts to prevent freezing in a sprinkler system made by Osmund Williams when he patented a nonfreezing chemical solution to be used in sprinkler pipes. The Harkness system also used a similar solution.
1864	The first automatic sprinkler head, as the term is used today, invented by Major A. Stewart Harrison of the First Engineer London Volunteers. This device was never patented and was apparently never put upon the market. The head consisted of a hollow brass casting shaped like a flattened sphere with an internal diameter of 3 inches. This contained a large number of countersunk holes. At the upper end, the head contracted into a cylinder 1 inch in diameter threaded on the outside so that it could be screwed into a pipe. Inside of this was a valve in the form of a cup-shaped piece of soft rubber which when closed held

back the water. The inside of the head at this point was tinned to prevent the rubber from sticking to the brass. Since the valve was of rubber and cup-shaped, the water tended to make the joint tighter as the pressure increased. The valve was held in place by a spindle which extended down through the head and through a wooden projection on the under side, to a shoulder at the lower extremity. Here it was held by low-fusing solder under compression. The wooden projection was put on, in order to insulate the solder joint from the brass casting and make the head more sensitive to heat. When the solder fused, the spindle and valve were pushed down by the water pressure and the water was discharged through the perforations.

1864 Another dry sprinkler system made by William Gilbert, Edwin Cooper and G.R. Webster used a fusible cord of gutta percha, chloride of sulphur, sulphuret of antimony, copper bronze and naphtha. This melted at from 90° to 120°F and was arranged so that when it fused it would release the hammer of an alarm and also open the water valve on a sprinkler supply pipe.

1870 Francis System of perforated pipe generally extended to cover picker, card and spinning rooms as well as other hazardous areas. Like other perforated pipe systems, the system was nonautomatic; a water control valve was manually operated to fill the perforated pipe and discharge water.

1872 The first patent upon an automatic sprinkler system in this country taken out by Philip W. Pratt of Abington, MA. This device consisted of two revolving hollow arms containing perforations. These arms were attached to a pipe containing water under pressure and there was a valve just above the connection ordinarily kept closed. There was a system of cords and fuses attached to the valve in such a way that when any fuse melted, the valve was opened.

1872 John Souther of Boston, MA advocated an automatic fire extinguisher consisting of perforated brass steam pipes. Steam was turned on automatically by the expansion of the pipe or by the burning of cords. A steam whistle was sounded at the same time.

1873 J.C. Meehan of Springfield, MA, patented an automatic steam sprinkler operated by fuses running to a small cylinder of gunpowder. When this exploded, a valve was opened.

1873 Buell sprinkler invented. This was probably the first head of the sensitive type to be put into practical use. It was also the first head to use the modern principle of distributing water coming through an open outlet by means of a splash plate or deflector.

1874 Henry S. Parmelee of New Haven, CT, invented the first automatic sprinkler head to be used extensively in practice. It is said that Parmelee objected to the high rates of insurance charged for his piano factory after the Chicago and Boston conflagrations. He was determined to find some form of protection that would warrant a reduction in rate.

Parmelee took out his first patent in August, 1874. This covered a device which consisted of a perforated head containing a valve that was held closed against water pressure by a heavy spring.

The sprinkler system in the Parmelee Piano Factory in New Haven was used for heating in extremely cold weather. There was an auxiliary system of steam pipes of sufficient capacity to heat the building in moderate weather, but in very cold weather, steam was let into the sprinkler pipes. The sprinkler heads were placed upon inverted U pipes to form a trap which would remain full of water and thus keep the steam from heating the heads unduly. The Parmelee system of piping, being a "tree" system, was especially adapted for this purpose. The heat that circulated in the main feed pipes would not cause much circulation in the branch pipes in which the sprinklers were located.

1875 Parmelee developed an entirely new type of sprinkler in which a brass cap was soldered over a distributor. This was one of the simplest sprinklers ever made but was not as sensitive as the previous type because water rested against the inside of the solder joint. This head was designed to screw onto a nipple and was threaded on the inside.

1878 The Parmelee sprinkler was further modified by substituting a rotating slotted turbine for the perforated distributor, thus improving the distribution, and giving less chance for clogging by sediment. The same year, the head was redesigned by Grinnell and made more sensitive by hollowing out the base so that much less of the solder joint was in contact with the water in the pipes. It was also threaded on the outside to fit a ½-inch pipe fitting.

These heads were screwed into the upper side of pipes suspended from the ceiling and spaced about 10 feet apart in each direction. When the head and the piping became heated to the fusing point of the solder (about 160°F), the pressure would force the cap off from the head and water would be distributed by the revolving turbine.

The method of piping originated by Parmelee and used for many years in his systems was the so-called "tree" system. The main feed pipes were placed about 20 feet apart and the branch lines were of ¾-inch pipe 5 feet long spaced about 10 feet apart on the feed pipe. This brought the heads about 10 feet apart in each direction.

The Parmelee system also contemplated an alarm valve which would operate a bell or a whistle in case one or more sprinklers opened. This consisted of a flapper check valve placed in the main riser near its base. A lever connected with the hinged end of the check extended through a stuffing box and was connected by a wire to a steam whistle or to a mechanical gong. When the check valve was lifted by the flowage of water, the steam whistle or the gong was put into operation.

1878 The Parmelee system first installed by the piping firm of Foskett, Bishop & Co., of New Haven, CT. The first regular installation, outside of an experimental one in the plant of the Parmelee Piano Works, was in the risk of M. Seward & Son, New Haven, CT. Later, Parmelee made arrangements with the Providence Steam & Gas Pipe Company for installing this system. This marked the formalization of the first pipe schedule systems. This company continued to install these heads until about 1882 when Frederick Grinnell invented an improved type of sprinkler which bears his name.

Some 200,000 Parmelee heads were installed, mostly in mills located in New England. The Parmelee catalog for 1881 gives a list of 214 plants equipped with the device. Of these, 140 were in New England. This catalog also gives a list of 19 fires successfully controlled by these heads between 1877 and 1881.

1879 John W. Bishop of New Haven, CT suggested a dry-pipe valve in 1879 and took out patents in 1881. This consisted of a vertically rising valve closing the water port. A stem on the upper side of the valve was clamped to an elastic diaphragm of a much larger area than the water valve. Water was allowed to enter the system above the diaphragm to a sufficient height to hold the valve closed by pressing on the upper side of the diaphragm. There was a by-pass containing a cock normally closed, extending from below the water valve to the space under the diaphragm.

A system of cords containing fusible links at short intervals was strung along the ceiling near the sprinklers and so arranged that when any link melted, a weighted lever connected to the cock was released. This opened the cock in the by-pass and allowed water pressure to enter the space under the diaphragm. This counteracted the pressure above the diaphragm and allowed the water pressure in the main pipe to open the water valve.

1879 Frederick Grinnell of Providence, RI took out his first patent on a dry valve. This consisted of a horizontal check valve seating vertically and with a stem running in guides. A system of levers was used to hold this valve securely closed. A small diaphragm in the lower part of the casting acted on a rod which was arranged to trip the levers. Air pressure pumped into the pipes above the check valve held this diaphragm down. When the air pressure was released, the diaphragm, actuated by a weighted lever or spring, was forced up and this motion tripped the levers and allowed the valve to open. This valve was self-contained, except for an alarm attachment.

1881 J.C. Meloon of Providence, RI patented an alarm valve of the vertical check type. The movement of the clapper operated an auxiliary valve which admitted water from below the check valve to a chamber. The water pressure in the chamber actuated a diaphragm which, when it moved, tripped the catch of a mechanical alarm.

1882 Frederick Grinnell took out a vast number of patents covering perforated pipes, sprinkler heads, deflectors, solder joints and many other details. Under his control, the Providence Steam & Gas Pipe Co., later the General Fire Extinguisher Co., became the leading sprinkler company in the country. Frederick Grinnell should be given the credit for doing more than any other one man to develop the art of sprinkler protection.

In 1882, he invented a sprinkler which was a radical departure from anything that had been made up to that time. Instead of a nozzle, he used a plate orifice. The valve and deflector were in one piece, the center of the deflector being depressed and filled with a disc of lead to form the valve. The deflector itself had teeth projecting at right angles around the edge to distribute the water. The valve was held in place by a pair of compound levers.

The Grinnell head soon became the standard sprinkler of the country and was very extensively used.

1884 Charles Buell patented a valve of the packed stem type in which the lever attached to a swing check started a train of clockwork actuated by a weight. This rang a mechanical gong. The Walworth Manufacturing Co. also made some valves of this general type.

1884 C. Woodbury, of the Boston Manufacturers Mutual Fire Insurance Co., and F. Cabot, of the Boston Board of Fire Underwriters, published their study of the performance of sprinklers. They set the scene for the development of sprinkler system installation rules.

1885 The first decade of the history of automatic sprinklers may be said to have ended in 1885. It was a period of prolific invention in which many heads of widely different types were thoroughly tested by field experience. The more important of these types were as follows:

- Heads depending upon the burning of cords.
- Rose heads of the sealed or water-joint type.
- Rose sprinklers with valves.
- Sealed type with turbine or slot distribution.
- Valve sprinklers with deflectors and operating by the fusing of solder.

1885 The first dry-pipe valve to be generally used was the Grinnell differential "bellows type" invented in 1885. The differential valve No. 12 which succeeded it in 1890 was very widely used.

1885 John Wormald, of the Mutual Fire Insurance Corporation of Manchester, England, wrote the first pamphlet of rules for automatic sprinklers.

1886 The developments which followed those in 1885 were more along the lines of perfecting old types rather than creating new ones. After 1885, there were practically no sprinklers made except valve sprinklers with deflectors. The development after this date consisted largely of improvements in the sub-types under this general heading. However, one rather distinct sub-type was created, namely, the valve held closed by a strut composed of several pieces of metal held together by low-fusing solder.

1887 Sprinkler system installation rules prepared by the Factory Improvement Committee of the New England Fire Insurance Exchange. Other insurance boards and bureaus also wrote rules about that time.

1895 In the Boston area alone, nine different standards for the size of pipe and for sprinkler spacing were in use by insurance organizations. At an informal meeting of representatives of inspection bureaus in New York in December 1895, a committee was named to formulate rules governing automatic sprinkler installations.

1896 At a second meeting of the representatives of the inspection bureaus, the recommendations of that committee were generally adopted by insurance inspection departments throughout the country. At the second meeting, a committee was appointed to present a plan for a permanent organization, which it did at a meeting in New York on Nov. 6, 1896. At that meeting, the NFPA was organized, with 20 insurance boards and bureaus as members.

The NFPA had rules for the installation of automatic sprinkler systems as its one and only standard at the time of its origin in 1896. The 1896 pipe schedule, known as the 1, 2, 4 schedule, allowed one sprinkler on ¾-inch pipe, two on 1-inch, four on 1 ¼-inch, etc.

1897 The NFPA Committee on Automatic Sprinklers consisted of five people. They represented the New York Board of Fire Underwriters, the Southeastern Tariff Association, the Factory Insurance Association and the Western FIA, and Underwriters' Bureau of New England.

1899 At the NFPA Annual Meeting, the President announced that, aside from the slight modifications required by local conditions, the underwriters' regulations governing the installation of sprinkler systems had been made uniform throughout the United States and Canada.

1900 The National Board of Fire Underwriters joined the NFPA and offered to adopt and publish the NFPA Standards — an offer that the NFPA accepted. Thus started the program by which from 1901 to 1964 the NFPA Standard for Installation of Sprinkler Systems was published by the National Board, first as rules and requirements, later as regulations, and still later as a standard of the National Board of Fire Underwriters as recommended by the National Fire Protection Association.

1901 Shaw developed a valve sprinkler with a toothed deflector and a frame of modern design. The actuating device which caused the parts of the strut to fall apart was a small receptacle containing alcohol or ether instead of an expansive wax. When the alcohol or ether expanded, the side of the thermostatic chamber was pressed outward and this movement threw out a key which allowed the strut to collapse.

1905 Based on fire experience that the 1896 pipe schedule was too liberal, the number of sprinklers on pipe of various sizes was decreased to what became known as the 1, 2, 3 schedule.

1906 First American District Telegraph Co. (ADT) sprinkler supervisory system marketed. Systems consisted of circuit breakers attached to check valves to give water flow alarm; gate valve attachments, pressure gages, water level attachments, temperature devices and the necessary transmitters, batteries, etc.

The purpose of the systems was to give notice at a central station in case anything happened to a sprinkler system to seriously impair its effectiveness or in case there was water flow in the pipes due to a break or to the opening of a sprinkler. The signals were transmitted to a central station through a closed circuit system of wiring and received there on a bell and tape machine. When a trouble signal was received, a runner was sent from the central station to investigate.

1910 The weave shed of a New Bedford cotton mill piped with a system that could be used both for sprinkler and heating purposes.

1922 First NFPA standard on foam extinguishing systems adopted. (Later became NFPA 11.)

1929 Adoption of NFPA standard on carbon dioxide fire extinguishing systems. (Later became NFPA 12.)

1930 Light hazard occupancy pipe schedule system added to the NFPA sprinkler system installation standard. Systems for extra hazard conditions were recognized as open-head systems, with use of a pipe schedule the same as for ordinary hazard occupancies.

1931 First NFPA standard on the use of inert gas for fire and explosion prevention adopted. (Later became NFPA 12A.)

1940 Sprinkler installation rules changed such that the smallest-size branch pipe was increased to 1 inch for several reasons. One reason was that 1-inch pipe would

	be less likely to plug up from rust and mud, as had been found in many ¾-inch lines in dry-pipe systems.
1940	First NFPA standard on water spray systems adopted. (Later became NFPA 15.)
1952	Factory Mutual developmental work on the "spray sprinkler" conducted.
1955	Former standard sprinkler designated as old type with the recognition of the new "spray sprinkler" as the standard sprinkler.
1955	Hydraulically designed sprinkler systems briefly addressed in NFPA 13.
1957	NFPA 17 on dry chemical extinguishing systems first adopted.
1962	NFPA 16 on foam water extinguishing systems first adopted.
1966	NFPA 13 expanded to include detailed rules covering hydraulically designed systems.
1970	NFPA 11A and 12A on high expansion foam systems and Halon 1301 systems, respectively, first adopted.
1972	NFPA 12B on Halon 1211 systems first adopted.
1973	NFPA 11B on synthetic foam and combined agent systems first adopted.
1973	Grinnell ON-OFF sprinkler listed and marketed.
1975	NFPA 13D on residential sprinkler systems using standard commercial sprinklers adopted.
1980	Viking large-drop sprinkler listed and marketed.
1980	NFPA 13D residential sprinkler system installation standard revised to require exclusive use of new "residential sprinkler."
1981	Grinnell residential sprinkler listed and marketed.

Significant Technological Developments Since 1979

Introduction

The purpose of this section of the *Almanac* is to highlight significant developments in fire protection technology during the last five years. The list has been limited to developments which have reached a stage of successful field application. There are perhaps other developments which have not been included here. It is hoped this section will expand as new editions of the *Almanac* are published, as it has not been the intent to knowingly exclude any notable achievements.

Residential Sprinklers

In 1973, the NFPA Committee on Automatic Sprinklers appointed a Subcommittee to prepare a residential sprinkler standard. In 1975, the first standard on the *Installation of Sprinkler Systems in One- and Two-Family Dwellings and Mobile Homes*, NFPA 13D was adopted, utilizing existing automatic sprinkler head technology. Actual installations based on this standard have been rare, however, primarily due to cost.

Beginning in 1976, the National Fire Prevention & Control Administration (later renamed the U.S. Fire Administration) funded a number of research programs to evaluate the residential fire problem in depth and determine the "what" and "how" of accomplishing a satisfactory solution. The NFPCA/USFA programs included studies to assess the probable impact of using sprinklers to reduce the incidence of deaths and injuries in residential fires. Other studies evaluated the design, installation, practical usage, and user acceptance factors that would impact on accomplishing reliable and acceptable installed systems; studies to evaluate minimum water discharge rates, automatic sprinkler flow and response sensitivity design criteria; and full-scale tests to test prototype systems.

In addition to spurring the development of new technology, the recent research also provided much of the basis for a complete revision to the 1975 edition of NFPA 13D. This revision was adopted in the fall of 1980 and, among other performance criteria, requires that only listed residential sprinklers shall be used.

In 1981, a breakthrough in sprinkler head technology was achieved by Grinnell Fire Protection Systems, Inc. A new, more sensitive sprinkler head, which activates five times faster than conventional heads, was listed by Underwriters Laboratories for residential use in accordance with NFPA 13D (1980). In addition to faster activation, the new technology offers an improved distribution pattern which cools adjacent air near other sprinklers, thus reducing the possibility of more than two heads activating. This assures an adequate rate of flow available to supply two heads. The new heads perform satisfactorily with a flow rate as low as 18 gpm for one sprinkler operating, and 13 gpm for two sprinklers operating (total flow of 26 gpm) at operating pressures below 40 psi.

As a result of this development, and in conjunction with low-cost piping, an entire residential sprinkler system is hopefully affordable to the average homeowner by keeping costs about one percent of the cost of a new home. Research is continuing, and a residential sidewall sprinkler which could reduce residential sprinkler costs further, particularly in retrofit installations, is now available.

Future developments addressing the need for even greater sensitivity appear to be imminent. One concept involves the development of an "on-off" type of sprinkler head for residential applications, while another involves the use of electronics to trigger sprinkler activation upon reaching a temperature or rate-of-rise threshold.

Although the greatest benefit of this residential sprinkler technology will be the lives saved and injuries prevented, lower property losses will be a secondary and substantial benefit of the installation of residential sprinklers.

Residential Sprinkler Research — Important Studies to Date

- Halpin, B.M., Dinan, J.J., and Deters, O.J., *Assessment of the Potential Impact of Fire Protection Systems on Actual Fire Incidents*, John Hopkins University-Applied Physics Laboratory (JHU/APL), Laurel, MD, October 1978.

  This study describes an in-depth analysis of fires involving fatalities and includes an assessment of how use of detectors, sprinklers or remote alarms would have changed the results.
- Yurkonis, Peter, *Study to Establish the Existing Automatic Fire Suppression Technology for Use in Residential Occupancies*, Rolf Jensen and Associates, Inc./Schirmer Engineering Corporation, Deerfield, IL, December 1978.

This study identified suppression systems and evaluated design and cost factors affecting practical usage and user acceptance.

- Kung, H., Haines, D., Green, R. Jr., *Development of Low-Cost Residential Sprinkler Protection*, Factory Mutual Research Corporation (FMRC), Norwood, MA, February 1978.

  This study is aimed primarily at development of low-cost residential sprinkler systems having minimal water discharge rates providing adequate life and property protection from smoldering fires.
- Henderson, N.C., Riegel, P.S., Patton, R.M., Larcomb, D.B., *Investigation of Low-Cost Residential Sprinkler Systems*, Battelle Columbus Laboratories (BCL), Columbus, OH, June 1978.

  Fire tests of commercial nozzles and evaluation of piping methods to achieve low-cost systems based on propane burner, wood crib and furniture fire tests.
- Clarke, Graham, *Performance Specifications for Low-Cost Residential Sprinkler System*, Factory Mutual Research Corporation, Norwood, MA, January 1978.

  A review of data from the listed USFA research efforts as a basis to prepare a proposed standard to install residential sprinkler systems and test residential sprinklers.
- Kung, H.C., Spaulding, R.D., Hill, E.E. Jr., *Sprinkler Performance in Residential Fire Tests*, Factory Mutual Research Corporation, Norwood, MA, July 1980.

  Fire tests on representative living room and bedroom residential configuration with combinations of furnishings and with open and closed windows and with variations in sprinkler application rates and response sensitivity of sprinklers. This work has been closely evaluated by the NFPA 13D Subcommittee during its conduct, and the Subcommittee was responsible for directing many of the test conditions which were evaluated.
- Cote, A., Moore, D., *Field Test and Evaluation of Residential Sprinkler Systems*, Los Angeles Test Series, National Fire Protection Association, Boston, MA, April 1980. (A report for the NFPA 13D Subcommittee).

  A series of fire tests in actual dwellings with sprinkler systems installed in accordance with the data resulting from all prior test work and the criteria included in the proposed 1980 revisions to NFPA 13D so as to evaluate the effectiveness of the system under conditions approaching actual use.
- Moore, D., *Data Summary of the North Carolina Test Series of USFA Grant 79027 Field Test and Evaluation of Residential Sprinkler Systems*. National Fire Protection Association, Boston, MA, September 1980. (A report for the NFPA 13D Subcommittee).

  A series of fire tests in actual mobile homes with sprinkler systems installed in accordance with the data resulting from prior test work and following criteria described in NFPA 13D-1980 in order to evaluate the effectiveness of the system under conditions approaching actual use.
- Kung, H.C., Spaulding, R.D., Hill, E.E. Jr., Symonds, A.P., *Technical Report, Field Evaluation of Residential Prototype Sprinkler, Los Angeles Fire Test Program*, Factory Mutual Research Corporation, Norwood, MA, February 1982.
- Cote, A.E., *Final Report on Field Test and Evaluation of Residential Sprinkler Systems*, National Fire Protection Association, Quincy, MA, July 1982.
- Factory Mutual Research Corporation/Underwriters Laboratories, Inc., *Standard for Residential Automatic Sprinklers for Fire Protection Service*, Northbrook, IL, April 1980.

  A study to develop a performance standard for testing residential sprinklers under room fire conditions that are in harmony with the requirements of NFPA 13D.
- Underwriters Laboratories, Inc., *Proposed Standard for Residential Automatic Sprinklers for Fire Protection Service*, UL-1626 Northbrook, IL, October 1980.

This standard describes the requirements for the testing of residential sprinklers by a testing laboratory.

Residential Remote Alarm Systems

Utilizing the burgeoning cable television industry systems, a new conceptual design for residential firesafety was recently announced, called The Automatic Remote Residential Fire Alarm System (ARRAS). While providing subscribers with cable TV programming, ARRAS is also capable of engaging an alarm to request aid from emergency facilities. The alarm can be transmitted directly to the emergency organization or a central monitoring station which would forward the emergency requests to police, fire, or medical services.

There has been some research completed in relation to these developments. In May 1980, a report was released by the U.S. Fire Administration relative to a remote detection/alarm system utilized in the planned community "The Woodlands" near Houston, TX. The objective of this study was to analyze the alarm history of a community protected by a remote detection/alarm system and evaluate the effectiveness in reducing fire losses.

A brief analysis of the report indicates a possible trend of lesser fire losses in homes equipped with the system. However, this is based on a limited number of incidences. One encouraging fact reveals there were no "large loss" fires (over $10,000) in homes equipped with an alarm system, whereas 4 such fires occurred in the community during the period of the study (10/1/75 - 9/30/78) in homes not so equipped.

One difficulty realized in "The Woodlands" system analysis was unnecessary activations. Cooking, system mechanical problems, and fireplaces accounted for the majority of these false activations. One important conclusion was that further research is necessary, including verification of the trends noted in "The Woodlands" study.

Another report prepared for the U.S. Fire Administration titled *Initial Report, A National Directory of Automatic Detection/Suppression and Remote Alarm Systems* was released in August 1980. The objective of this report was to develop a national directory for extent and type of automatic detection, suppression and remote alarm systems. The report points out that as economic constraints increase, many communities are still faced with growth rates which demand additional fire protection capability. Without the funding to support actual in-place apparatus, fire fighting and inspection personnel, one choice is more balance between these services and built-in protection — such as remote detection and alarm systems.

Although much of the report is directed at detection and suppression facilities, the report has indicated that the relatively new transmission capabilities of cable television facilities are fast growing. The survey reveals 19 existing cable alarm services and 16 more in the planning stage. The number of actual subscribers to these services is difficult to determine, and the survey points out (as did the previous report cited above) that false alarms are one of the early problems experienced.

For further information see: 1) "Remote Detection and Alarm for Residences: The Woodlands System," prepared by the Federal Emergency Management Agency/U.S. Fire Administration, May 1980; and 2) David B. Gratz and Raymond E. Hawkins, *Initial Report, A National Directory of Automatic Detection/Suppression and Remote Alarm Systems,* prepared for the Federal Emergency Management Agency/U.S. Fire Administration, August 1980.

Large Drop Sprinkler

As early as 1968, the Factory Mutual Research Corporation (FM) has been expanding its program for improved sprinkler technology. This program is referred to as the "Sprinkler Optimization Program." The development of the quick response residential sprinkler was partially developed through this program. An additional sprinkler technology which has recently come to the forefront is the idea of the "large drop" sprinkler.

The desire to provide better automatic sprinkler protection for the very "high challenge" fire served as the motivation for the research and development of this concept. The high challenge fire produces gases of high temperature very rapidly, resulting in high velocity fire plumes and high rates of heat release. The initial theory was to produce a high proportion of "large drops" which could be effective in forcing their way through the high velocity plume, thus reaching the surface of the burning fuel — to affect extinguishment.

With this in mind, the most important characteristic of the new heads was the penetration — considered as the "limit density of GPM per sq. ft." This is the actual density of water delivered to the base of the fire.

The sprinkler promoted by FM has an orifice size of .64 in. diameter with other modifications. The installation of this sprinkler is intended to be controlled by the use of specific guidelines from FM, not by application of NFPA 13. According to FM, this is because the density/area concept (per NFPA 13) is meaningless with use of the large drop sprinkler. FM guidelines use a "pressure spacing" base.

The FM guidelines for application of this technology are available to the public. An interesting result of the many tests conducted by FM is that it was found that an increase in pressure would increase "penetration" and decrease the number of sprinklers operated. This results in lower water demand, lower ceiling temperatures, and less fire damage. The FM guide recommends a minimum pressure of 25 psi.

The spacing, pressure, and distribution patterns are also very important — perhaps as much so as the drop size itself. FM emphasizes that design of systems using this sprinkler technology must be as per the FM guidelines and based on individual conditions analyzed on a case-by-case basis. FM points out that use of this type sprinkler using NFPA 13 standards may result in total failure of the resulting system.

Electronics

Modern electronic advances and computer technology has progressed rapidly, and with the extremely small components and mass production capabilities combined, more and more applications are becoming evident at lower and lower costs. As an example, sophisticated smoke detectors of both the photoelectric and ionization types are readily available on the shelves of department stores, and with a price tag of $10-$15 are affordable by most American households.

Further applications have been developed or refined, particularly within the fire service. Some notable applications include pocket-size personal alert devices (P.A.D.s) and computer-aided dispatch systems (C.A.D.S.).

Solid state technology has considerably reduced the size of equipment. In addition, systems are becoming modular in design so that flexibility in choosing various functions and performance levels is enhanced. The greatly increased data storage capacity of most systems is very useful to fire service facilities throughout the country.

Another advantage of more recent developments is the availability of less expensive, smaller rechargeable batteries to provide standby emergency power. The newer systems have much lower power demands, thus lessening the need for large standby power installations.

The most dramatic advances in fire alarm technology have been associated with emergency voice communications. This is due largely to the need for orderly movement of occupants in high-rise structures. Pre-recorded voice instructions can be provided upon actuation of the central control unit, although fire department personnel can override these announcements with live broadcasts when necessary.

Fire Protection Standards

Organizations and Agencies that Develop Standards or Regulations Related to Firesafety

The following list contains the names of 50 U.S. and foreign organizations that develop fire protection or fire protection-related standards or regulations. Included are U.S. voluntary organizations, U.S. government agencies, and foreign voluntary organizations.

U.S. VOLUNTARY STANDARDS-MAKING ORGANIZATIONS

Name	Description	Founding Date	Number of Members	Number of Staff	Meetings
American Association of Textile Chemists and Colorists (AATCC) P.O. Box 12215 Research Triangle Park, NC 27709 (919) 549-8141 William R. Martin, Jr. Exec. Dir.	A technical and scientific society which maintains 60 research committees and is recognized as an authority for the development of standard test methods for flammability of clothing textiles.	1921	8,000	21	annual
American Concrete Institute (ACI) P.O. Box 19150, Redford Station Detroit, MI 48219 (313) 532-2600 George F. Leyh, Exec. Dir.	A technical society for those interested in improving design, construction and maintenance of concrete products and structures. Sponsors 124 technical committees made up of architects, engineers, educators, and other interested groups.	1905	16,000	45	semi-annual (spring and fall)

Name	Description	Founding Date	Number of Members	Number of Staff	Meetings	Serves on NFPA Committee	NFPA Serves on Its Committee
American Gas Assn. (AGA) 1515 Wilson Blvd. Arlington, VA 22209 (703) 841-8400 George H. Lawrence, Pres.	Provides information on safety of all phases of gas transmission and distribution. Promotes employee and public safety. Maintains an independent committee that compiles standards on construction and performance of appliances and equipment as well as special committees in the area of gas industry interest. Cosponsor with the NFPA of American National Standard ANSI Z223.1-1980, *National Fuel Gas Code.*	1918	4,800	420	annual (October)	X	
American Insurance Assn. (AIA) 85 John St. New York, NY 10038 (212) 699-0400 T. Lawrence Jones, Pres.	Membership represents companies providing property and liability insurance and suretyship. Maintains standing committees with varied interests including fire prevention. Publishes information on fire prevention as well as suggested codes and ordinances.	1964	147	323	annual (May)	X	
American National Standards Institute (ANSI) 1430 Broadway New York, NY 10018 (212) 354-3300	Serves as a clearinghouse for nationally coordinated voluntary safety, engineering, and industrial standards. Gives status as	1918	1,025	115	annual	X	X

Donald L. Peyton, Exec. V. Pres.	American National Standards to standards developed by agreement from all groups concerned. Represents U.S. interests in international standardization work.					
American Nuclear Society (ANS) 555 N. Kensington Ave. LaGrange Park, IL 60525 (312) 352-6611 Octave J. DuTemple, Exec. Dir.	Membership includes professionals with experience in nuclear science or nuclear engineering. Society maintains various standards committees, including those dealing with nuclear reactor safety, radiation protection and shielding, and thermal hydraulics	1954	13,000	85	semi-annual (spring and fall)	X
American Petroleum Institute (API) 2101 L St., NW Washington, DC 20037 (202) 457-7000 Charles J. DiBona, Pres.	Membership includes producers, refiners, marketers, and transporters of petroleum products. Publishes safety codes and standards on fire protection for the petroleum industry.	1919	7,500	500	annual (November)	X
American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) 1791 Tullie Circle, NE Atlanta, GA 30329 (404) 636-8400 A.T. Boggs, Exec. V. Pres.	Professional society of heating, refrigeration, air-conditioning, and ventilating engineers. Sponsors 88 technical committees and publishes standards on various aspects of air-conditioning, heating, and refrigeration systems.	1894	45,000	75	annual (June)	X

Name	Description	Founding Date	Number of Members	Number of Staff	Meetings	Serves on NFPA Committee	NFPA Serves on Its Committee
American Society of Mechanical Engineers (ASME) 345 E. 47th St. New York, NY 10017 (212) 644-7722 Dr. Burke E. Nelson, Exec. Dir.	Technical society of mechanical engineers. Develops the *Boiler and Pressure Vessel Code,* power test codes, and other safety codes and standards for equipment.	1880	104,000	250	semi-annual (June and November)	X	X
ASTM formerly: American Society for Testing and Materials (ASTM) 1916 Race St. Philadelphia, PA 19103 (215) 299-5400 William T. Cavanaugh, Pres.	Publishes standard fire tests of building construction and materials; combustibility and surface flammability of various building construction assemblies; and, recommends practices for preparation of fire test standards. Sponsors 138 technical committees and develops voluntary consensus standards for materials, products, systems, and services.	1898	31,000	200	monthly	X	X
American Water Works Assn. (AWWA) 6666 Quincy Ave. Denver, CO 80235 (303) 794-7711 David B. Preston, Exec. Dir.	Membership composed of individuals interested in public water supply. Develops standards for fire hydrants, piping systems, valve-types, and other water installation systems.	1881	34,000	70	annual (June)	X	X

American Welding Society (AWS) 2501 NW, 7th St. Miami, FL 33125 (305) 642-7090 Perry Rippolo, Exec. Dir.	Professional engineering society in the field of welding. Sponsors approximately 100 technical committees. Publishes codes, standards, specifications, and handbooks on welding.	1919	35,000	70	annual (April)	X	
Building Officials and Code Administrators International (BOCA) 17926 S. Halsted St. Homewood, IL 60430 (312) 799-2300 Clarence R. Bechtel, Exec. Dir.	Promotes establishment of minimum building codes and develops and publishes Basic Building, Fire Prevention, Energy Conservation, Industrialized Dwelling, Mechanical, Plumbing, and Property Maintenance Codes. Maintains committees relating to development of the above codes.	1915	5,000	35	annual (June)	X	X
Compressed Gas Assn. (CGA) 1235 Jefferson Davis Hwy. Arlington, VA 22202 (703) 979-0900 Bernhard K. Kuehn, Pres.	Trade association which recommends improved safety standards for methods of handling, transporting, and storing gases. Acts as an advisor to authorities concerned with the regulation of safe handling of compressed gases; and collaborates with national standards organizations to develop specifications and standards for safety.	1913	300	?	annual (January)	X	
Council of American Building Officials (CABO) 5205 Leesburg Pike Falls Church, VA 22041 (703) 931-4533 Richard P. Kuchnicki, Exec. Dir.	Membership composed of the 3 model code groups' membership. Publishes the One- and Two-Family Dwelling Code and develops, recommends and promotes uniform regulations and adoption of model codes.	1972	8,000	4	annual	X	X

Name	Description	Founding Date	Number of Members	Number of Staff	Meetings	Serves on NFPA Committee	NFPA Serves on Its Committee
Fire Equipment Manufacturers Association (FEMA) c/o Thomas Associates, Inc. 1230 Keith Building Cleveland, OH 44115 (216) 241-7333 John H. Addington, Exec. Dir.	Manufacturers of devices that detect, control or extinguish fires. Assists in promulgating standards and maintains committees dealing with firesafety.	1925	32	5	annual	X	
Institute of Electrical and Electronics Engineers (IEEE) 345 E. 47th St. New York, NY 10017 (212) 705-7900 Eric Hertz, Exec. Dir. and Gen. Mgr.	Engineers and scientists in electrical and electronic engineering. Publishes standards relating to these fields.	1884	220,000	350	irregular	X	X
Instrument Society of America (ISA) P.O. Box 12277 67 Alexander Dr. Research Triangle Park, NC 27709 (919) 549-8411 Glenn F. Harvey, Exec. Dir.	Organization serves to advance the knowledge of and use of instruments and controls in science and industry. Publishes standards and handbooks.	1945	30,000	60	annual (October)	X	
International Association of Fire Chiefs 1329 18th St., NW Washington, DC 20036 (202) 833-3420 Donald D. Flinn, Gen. Mgr.	Membership composed of city, state, military, and industrial fire chiefs, and others interested in fire prevention. Maintains committees on Building Codes, and Standardization of Fire Hose among others.	1873	7,200	18	annual (September)	X	

International Conference of Building Officials (ICBO) 5360 S. Workman Mill Rd. Whittier, CA 90601 (213) 699-0541 James E. Bihr, Exec. Dir.	Publishes, maintains and promotes the Uniform Building, Mechanical, Housing, Fire, Sign and other codes. Maintains a Code Development Committee.	1922	3,600	56	annual (September)	X
Lightning Protection Institute (LPI) P.O. Box 406 Harvard, IL 60033 (815) 943-7211 Marvin M. Frydenlund, Mng. Dir.	Manufacturers and installers of approved lightning protection equipment. Maintains a committee on codes and specifications relating to lightning safety.	1956	125	4	every 18 months	X
National Board of Boiler and Pressure Vessel Inspectors 1055 Crupper Ave. Columbus, OH 43229 (614) 888-8320 S.F. Harrison, Exec. Dir.	Membership includes chief boiler inspectors of states, major US cities and provinces of Canada having boiler laws. Publishes the National Board Inspection Code.	1919	52	40	annual (May)	
National Electrical Manufacturers Assn. (NEMA) 2101 L St., NW Washington, DC 20037 (202) 457-8400 Bernard H. Falk, Pres.	Membership includes manufacturers of electrical equipment. Publishes safety standards and the *Training Manual for Local Fire Protective Signalling Systems.* Participates in the development of the *National Electrical Code* and the *National Electrical Safety Codes.*	1926	550	100	annual (November)	
National Fire Sprinkler Association (NFSA) P.O. Box 1000 Patterson, NY 12563 (914) 878-4200 Edward J. Reilly, Pres.	Manufacturers and installers of automatic sprinkling devices. Participates in the development of model fire protection codes and fire test research.	1914	350	21	annual	X

Name	Description	Founding Date	Number of Members	Number of Staff	Meetings	Serves on NFPA Committee	NFPA Serves on Its Committee
Society of Automotive Engineers (SAE) 400 Commonwealth Dr. Warrendale, PA 15096 (412) 776-4841 Joseph Gilbert, Exec. V. Pres.	Membership includes engineers and scientists in the field of self-propelled mechanisms. Publishes standards and handbooks.	1905	36,000	150	annual (February)	X	
Society of Fire Protection Technicians (SFPT) Delaware Technical and Community College 400 Christian A-Stanton Rd. Newark, DE 19702 (302) 368-6953 R. Larry Alfree, Pres.	Membership is composed of fire protection professionals in industry, insurance, education, government, or private practice. Helps develop uniform professional standards for fire protection technicians. Promotes adoption, enforcement and administration of firesafety and life safety regulations. Maintains a codes and standards committee.	1974	94	n/a	annual (September)		
Society of the Plastics Industry (SPI) 355 Lexington Ave. New York, NY 10017 (212) 573-9400 G.R. Munger, Pres.	Manufacturers and processors of raw plastic materials and plastic products. Proposes standards for various plastics products and maintains 17 committees.	1937	1,500	75	annual	X	
Southern Building Code Congress International (SBCCI) 900 Montclair Rd.	Develops, maintains, and promotes the adoption of the Standard Building, Gas,	1940	2,100	19	annual (October)	X	

Birmingham, AL 35213 (205) 591-1853 William J. Tangye, Exec. Dir.	Plumbing, Fire Prevention, Mechanical, and Housing Codes. Participates in the development of nationally recognized consensus standards. Maintains a code revision committee.						
Technical Association of the Pulp and Paper Industry (TAPPI) One Dunwoody Park Atlanta, GA 30338 (404) 394-6130 Philip E. Nethercut, Exec. Dir.	Engineers, scientists, and administrators in the pulp and paper industry. Develops test methods for laboratory analyses and process control. Co-sponsor with the American Paper Institute of the American National Standards Committee on pulp, paper and paperboard.	1915	18,000	50	annual (March)		
Underwriters Laboratories Inc. (UL) 333 Pfingsten Rd. Northbrook, IL 60062 (312) 272-8800 Jack Bono, Pres.	Publishes firesafety standards for electrical shock, explosion,, detection and alarm, material flammability, smoke density, fire extinguishment, fire resistance of structural materials, and ignition sources.	1894	n/a	2,500	n/a	X	X

Foreign Voluntary Standards-Making Organizations

Name	Description	Founding Date	Number of Members	Number of Staff	Meetings	Serves on NFPA Committee	NFPA Serves on its Committee
International Electrotechnical Commission (IEC) 1, rue de Varembé CH–1211 Geneve 20 Switzerland (022) 34 01 50 M.C.J. Stanford, Secretary General	Promotes international standardization in the field of electrical and electronic engineering. IEC is composed of 43 national committees representing countries which comprise over 80% of the world's population and consume over 95% of the world's electric energy. Publishes standards and other recommendations which standardizing authorities use in formulating their national standards.	1906	n/a	n/a	annual	X	X
International Standards Organization (ISO) 1, rue de Varembé Case Portale 56 CH–1211 Geneve 20 Switzerland (022) 34 12 40 Olle Sturen, Secretary General	Promotes standardization worldwide and develops and publishes International Standards. Maintains 163 technical committees. Membership is composed of one national standards body representing each member country. By March 1982, the number of member bodies was 72.	1947	88	120	triennial	X	X

Australian Fire Protection Assn. (AFPA) 40 Chetwynde St. West Melbourne 3003, Victoria Australia Melbourne 02329 5577 D.E. Smith, Tech. Dir.	A nonprofit, technical and educational organization. Prepares and publishes Australian standards to promote their adoption. Standards are in the form of specifications for materials and products, codes of sound or safe practices, methods of testing, nomenclature, etc.	1922	2,000	?	annual (October or November)		
British Standards Institute (BSI) 2 Park St. London WIA 2BS, England (01) 629 9000 Dr. G.B.R. Feiden	Recognized body for the preparation of national standards in the UK. Its main function is to draw up voluntary codes and standards of good practice by agreement among all interests concerned, and to promote their adoption. Participates in the work of both the ISO and IEC.	1901	?	550 (1966)	?		
Canadian Standards Association (CSA) 178 Rexdale Blvd. Rexdale, Ontario M9W IR3 Canada (416) 744 4010 John E. Kean, Pres.	A national, independent, private sector organization to provide for standardization by voluntary agreement of interested parties through the consensus principle. CSA is a participant in the National Standards System sponsored by the Standards Council of Canada, and participates in the work of the ISO and IEC. The CSA publishes over 1,000 standards in over 30 major areas, including firesafety.	1919	2,300	600	?	X	X

U.S. Government Agencies

Name	Description	Founding Date
Consumer Product Safety Commission (CPSC) 1111 Eighteenth St., NW Washington, DC 20207 (202) 634-7740 Nancy Harvey Steorts, Chairman	An independent federal regulatory agency with responsibility for implementing provisions of the Flammable Fabrics Act and the Federal Hazardous Substances Act. It also encourages and assists in the development of voluntary safety standards related to safety of consumer products; and establishes, where appropriate, mandatory consumer product standards.	1972
Environmental Protection Agency (EPA) 401 M St., SW Washington, DC 20460 (202) 382-2090 William Ruckelshaus, Administrator	Established as an independent agency with responsibility for coordination of effective government action on behalf of environmental quality. It coordinates the activities under the Toxic Substances Control act with other agencies for the assessment and control of toxic substances; and it endeavors to abate and control pollution through a variety of research, monitoring, standards setting, and enforcement activities.	1970
Federal Aviation Administration, US Department of Transportation (FAA) 800 Independence Ave., SW Washington, DC 20591 (202) 426-4000 J. Lynn Helms, Administrator	Became a part of the DOT in 1967. Charged with regulating air commerce to foster aviation safety. Issues and enforces rules, regulations, and minimum standards for a safe and efficient system of air navigation and air traffic control. Promulgates and enforces rules and regulations applicable to firesafety of civil aviation, including firesafety of air crafts, airports, and the handling and transportation of hazardous materials by air.	1967 (1926)
Federal Housing Administration, US Department of Housing and Urban Development (FHA) 451 Seventh St., SW Washington, DC 20410 (202) 655-4000 Philip Abrams, General Deputy Assistant Secretary for Housing—Deputy Federal Housing Commissioner	Promulgates and enforces minimum property standards for one- and two-family dwellings, multi-family housing, and care type housing. Insurance on mortgages and loans and direct assistance programs are conditioned in compliance with these standards. Extensive referencing of NFPA standards is made in the Minimum Property Standards.	
Federal Railroad Administration, US Department of Transportation (FRA)	Promulgates and enforces regulations concerning firesafety in rail transportation.	1966

Name	Description	Founding Date
400 Seventh St., SW Washington, DC 20590 (202) 426-0881 Robert W. Blanchette, Administrator		
General Services Administration (GSA) General Services Building Eighteenth and F Sts., NW Washington, DC 20405 (202) 655-4000 Gerald P. Carmen, Administrator	A major provider of supplies and buildings to federal agencies. Through purchase specification, GSA has major influence, not only regarding the safety of products it buys, but also of those available to the general public. GSA has made major advances in developing and adopting a systems approach to firesafety in buildings.	1949
Materials Transportation Bureau, US Department of Transportation (MTB) 400 Seventh St., SW Washington, DC 20590 (202) 755-9260 L.D. Stantman, Associate Administrator for Materials Transportation	Develops and issues regulations for the safe transportation of hazardous materials by all modes, excluding bulk transportation by water. Within the MTB, the Office of Hazardous Materials Regulations promulgates and enforces regulations for the safe transportation of hazardous materials; and the Office of Pipeline Safety Regulation establishes and enforces regulations for safe construction and operation of pipelines and gas conversion and storage facilities, the latter in conjunction with the US Coast Guard.	1975
Mine Safety and Health Administration (MSHA) 4015 Wilson Blvd. Arlington, VA 22203 (703) 235-1452 Ford B. Ford, Asst. Sec. of Labor for Mine Safety and Health	Develops and promulgates mandatory safety and health standards, ensures compliance with such standards, assesses civil penalties for violators, investigates accidents, cooperates with and provides assistance to the states in the development of effective state mine safety and health programs, improves and expands training programs, contributes to the improvement and expansion of mine safety and health research and development.	1977
National Bureau of Standards, US Department of Commerce (NBS) Washington, DC 20234 (301) 921-1000	A federal agency with a direct firesafety mission. The NBS has been engaged in fire research mainly concerned with building technology and fire testing of materials. It administers the Voluntary Product Standards program as a supplement to the activities of the private sector standardizing organizations.	1901

Name	Description	Founding Date
National Highway Traffic Safety Administration, US Department of Transportation (NHTSA) 400 Seventh St., SW Washington, DC 20590 (202) 426-1828 Raymond A. Peck, Jr., Administrator	Promulgates and enforces Federal Motor Vehicle Safety Standards, including firesafety regulations, for domestic and foreign vehicles sold in the US.	1970
Nuclear Regulatory Commission (NRC) 1717 H St., NW Washington, DC 20555 (301) 492-7000 Nunzio J. Pallidino, Chairman	Develops and implements rules and regulations for the physical protection of nuclear facilities and materials licensed by it.	1974
Occupational Safety and Health Administration, US Department of Labor (OSHA) 200 Constitution Ave., NW Washington, DC 20210 (202) 523-8165 Thorne G. Auchter, Asst. Secretary for Occupational Safety and Health	Establishes, develops and promulgates occupational safety and health standards. Develops and issues regulations, conducts investigations and inspections to determine the status of compliance with safety and health standards and regulations. More than 50 NFPA standards are adopted by reference as the basis of OSHA regulations.	1970
United States Coast Guard, US Department of Transportation (USCG) 2100 Second St., SW Washington, DC 20593 (202) 426-2158 Adm. James S. Gracey, USCG, Commandant	Promulgates and enforces safety regulations, including firesafety for merchant ships, port, and offshore drilling facilities. Assists in fighting shipboard fires and fires in port facilities.	1915
Urban Mass. Transportation Administration, US Department of Transportation (UMTA) 400 Seventh St., SW Washington, DC 20590 (202) 426-4043 Arthur E. Teele, Jr., Administrator	Assists in developing mass transportation facilities and in planning and establishment of metropolitan and area-wide transportation systems. Establishes safety standards for equipment and buildings constructed with agency funds.	1968
Veterans Administration (VA) 810 Vermont Ave., NW Washington, DC 20420 (202) 393-4120 Robert P. Nimmo, Administrator	An independent agency which guarantees mortgage loans for veterans to purchase homes meeting requirements of HUD minimum property standards. VA also operates over 170 medical centers for veterans. VA requirements for fire retardant furnishings, garments, and interior finishes in hospitals are among the most stringent.	1930

STATES THAT HAVE ADOPTED MODEL BUILDING AND FIRE CODES

State	Building Code					Electrical Code		Fire Code					Fire Prevention Code							Life Safety Code (Means of Egress)				
	BOCA Bldg. Code (BOCA)	National Bldg. Code (AIA)	Standard Bldg. Code (SBCCI)	Uniform Bldg. Code (ICBO)	State Bldg. Code	National Electrical Code (NFPA)	State Electrical Code	BOCA Fire Code (BOCA)	National Fire Codes (NFPA)	Standard Fire Code (SBCCI)	Uniform Fire Code (ICBO)	State Fire Code	AIA Fire Prevention Code (AIA)	BOCA Fire Prevention Code (BOCA)	National Fire Codes (NFPA)	Life Safety Code (NFPA)	Standard Fire Prev. Code (SBCCI)	Uniform Fire Prev. Code (ICBO)	State Fire Prevention Code	BOCA Fire Code (BOCA)	Life Safety Code (NFPA)	Standard Fire Code (SBCCI)	Uniform Fire Code (ICBO)	State Fire Code
ALABAMA			X^t			X^t											X^t				X^t			
ALASKA																								
ARIZONA																								
ARKANSAS		X	X^t			X						X							X		X			
CALIFORNIA				X		X					X							X					X	X
COLORADO				X		X																	X	
CONNECTICUT	(X)				X	X						X				X					X			
DELAWARE						X			X										X		X			

State	Building Code					Electrical Code		Fire Code					Fire Prevention Code							Life Safety Code (Means of Egress)				
FLORIDA		X	X		X	X						X^F							X^F		X			
GEORGIA			(X)		X	(X)	X		X						X						X			
HAWAII																								
IDAHO				X		X					X										X			
ILLINOIS												X							X					X
INDIANA				(X)	X		X											(X)	X				(X)	X
IOWA				(X)	X	X	X					X^F							X^F					X^F
KANSAS				X^S		X^S															X^S			
KENTUCKY	(X)				X	(X)	X					X			(X)				X		(X)			X
LOUISIANA			X^H			X			X							X					X			
MAINE						X			X^P						X^P						X			
MARYLAND	(X)				X	(X)	X		(X)			X							X					X
MASSACHUSETTS	(X)				X	(X)	X	(X)				X		(X)					X	(X)				X
MICHIGAN	(X)				X	(X)	X	(X)				X							X	(X)				X
MINNESOTA				(X)	X	(X)	X				X							X					X	
MISSISSIPPI			X			X^t											X				X			
MISSOURI																								

MONTANA				X		X					X							X					X	
NEBRASKA						X						X^F							X^F					X^F
NEVADA				X^t		X					X^t										X^t			
NEW HAMPSHIRE	X					X			X^P					X							X			
NEW JERSEY	(X)				X	(X)	X	(X)				X												X
NEW MEXICO				X		X					X										X			
NEW YORK					X	(X)	X					X							X					X
NORTH CAROLINA			(X)		X	X				(X)		X	X									(X)		X
NORTH DAKOTA				X		X					X					X					X			
OHIO	(X)				X		X	(X)				X		(X)					X	(X)				X
OKLAHOMA	(X)				X				X^{Pt}												X^t			
OREGON				(X)	X	(X)	X				(X)	X			X								(X)	X
PENNSYLVANIA												X							X					X
RHODE ISLAND	(X)				X	(X)	X					X							X					X
SOUTH CAROLINA			X			X				X											X			
SOUTH DAKOTA						X			X^P		X					X					X			
TENNESSEE			X			X	X		X						X						X			
TEXAS															X^P									X
UTAH				X^B		X			X		X							X	X		X			

State	Building Code					Electrical Code		Fire Code					Fire Prevention Code							Life Safety Code (Means of Egress)				
VERMONT		X				X			X^P						X^P						X			
VIRGINIA	X					X		X												X				
WASHINGTON				X		X																		
WEST VIRGINIA						X						X							X					X
WISCONSIN					X	X						X			X^P				X					X
WYOMING				X		X					X							X					X	
PUERTO RICO	(X)			(X)	X	(X)	X	(X)			(X)	X			(X)				X	(X)			(X)	X
VIRGIN ISLANDS					X	X						X							X					X

The above information was compiled from the *1982 Directory of State Building Codes and Regulations* published and copyrighted by the National Conference of States on Building Codes and Standards, Inc. (NCSBCS), 481 Carlisle Drive, Herndon, Virginia 22070. The complete *Directory* containing 22 different code areas, is available from NCSBCS at per copy prices of $52.50 for non-members of the NFPA and $40 for NFPA members. Call (703) 437-0100, extension 45, to order.

t – State Buildings
S – Schools
H – High rise
P – Partial
F – Fire Marshal Rules
B – Bldg. built w/ state money only
(X) – Based upon this code

NFPA Codes and Standards Development

Modern firesafety standards trace their origins to the nineteenth century development of automatic sprinklers. From the beginning, sprinklers performed well as extinguishing devices; however, they originally were installed in so many different ways that their reliability was uncertain.

In 1895 a small group of men representing sprinkler and fire insurance interests gathered in Boston to discuss these inconsistencies. They knew that nine radically different standards for piping size and sprinkler spacing could be found within 100 miles of the city. They realized that this plumber's nightmare had to be resolved or the rate of sprinkler system failure might prove unacceptable.

The group eventually created a standard for the uniform installation of sprinklers. The descendant of that standard can be found today among some 270 specific firesafety standards maintained by the National Fire Protection Association (NFPA).

The NFPA Standards-Making System

The NFPA has achieved its public esteem only through the careful building and constant monitoring of an open standards-development process. How the NFPA standards-making system works is described in the following paragraphs.

Administration of the System

The NFPA Board of Directors has general charge of all NFPA activities and it adopts Regulations Governing Committee Projects under which all committees involved in standards making operate. The Board also appoints a 13-person Standards Council to administer the Regulations. Members of the Council are familiar with the technical and standards development functions of the Association and are selected from a broad range of appropriate interests. The Secretary of the Council is a member appointed by the Association President with the approval of the Board of Directors.

New Projects

Anyone can suggest the need for a new firesafety standard. An announcement of a request for a new standard is made in the NFPA membership newsletter, *Fire News*; in the American National Standards Institute publication, the *ANSI Reporter*; and in relevant trade and professional journals. Comments are requested on the need for the standard, what organizations may be active in the subject matter of the standard, what resource material is available, and who would be interested in participating in the writing of the standard.

The proposed standard and the public comments it generates are then turned over to the NFPA Standards Council for action on whether or not a project will be established to prepare the standard. If the Council determines the need for the proposed project, it either assigns the project to an existing technical committee or establishes a new committee reflecting a fair balance of concerned interests. All NFPA standards are developed and periodically revised by these technical committees — willing experts representing the government, educational institutions, business, insurance, industry, and consumers. Some 2,400 persons with diverse interests and expertise in firesafety comprise the approximately 170 technical committees within the NFPA standards-making system. Each committee member is classified by interest and each committee is structured so that not more than ⅓ of the membership is from a single interest. Each committee is assigned a scope of activity so as to avoid conflict or duplication of effort.

Technical Committee Activities

After a technical committee has been established by the Standards Council, the Association issues public notices announcing the committee's next meeting date and calling for specific proposals from interested persons. Proposals may be made for text to be in a new standard or for text to amend an existing standard. This public notice appears in *Fire News*, the *ANSI Reporter*, and relevant trade journals.

The committee meets to consider all proposals received. Eventually, the committee drafts a proposed standard, or amendments to an existing standard, reflecting approval by at least 2/3 of its members.

All the proposals considered, together with the committee's action on each (including the reasons for not accepting any proposal), are published as the Committee's Report in the NFPA's *Technical Committee Reports* (TCR), as is the draft of a proposed new standard. These TCRs, which are widely distributed, are sent automatically to each proposer and are available to anyone upon request. Over a 60-day period, the Association solicits public comments on all TCRs.

Technical Committee Documentation

Public comments on the TCRs are considered by the appropriate technical committees. All comments, committee action on comments, and committee reasons for not accepting comments are published as the Committee's Supplementary Report in the NFPA's *Technical Committee Documentation* (TCD). The documentation is furnished automatically to each commentor and is available to anyone upon request.

The Committee's Report and Supplementary Report are then presented for open debate at either of NFPA's semiannual meetings held in various cities throughout the United States and Canada in May and November. Anyone, regardless of membership in NFPA, may present views at these meetings. With all views known, an informed NFPA membership votes to approve, amend, return a portion of the report to committee, or return the report to committee. The Standards Council then decides whether or not to issue the standard, based on all of the information presented to it, including the vote of the membership. If the standard is issued by the Standards Council, it is published in booklet form and also included in the appropriate volume of NFPA's annually published *National Fire Codes®*. Availability of the printed standard is then widely publicized by the Association.

Procedural Safeguards

The NFPA staff constantly monitors the committee activities to ensure compliance with the Regulations Governing Committee Projects.

Complaints and Appeals

Anyone dissatisfied with action taken within NFPA's standards-making system may file a complaint to the Association's Standards Council. Areas of complaint may cover: the Standards Council's decision on whether a certain standard should be developed; the Association's action on a proposed committee report; the technical validity or fairness of a certain standard; and the Council's decision on the appointment of a nominee to a committee. Appeals on the action of the Standards Council may be made to the Board of Directors.

Public Notice

The NFPA constantly seeks out new ways to encourage technical and consumer input to the standards-making system. Public notices play a major role in fulfilling this objective. Currently, eleven steps are subject to some form of public notice: the intent to develop a standard; the schedule of technical committee meetings; the call for proposals to develop or amend a standard; the disposition of the proposals; the availability of draft standards for public review and comment; the disposition of specific public comments; announcements of all Association meetings; announcements on the fate of each proposed standard; and finally, frequent notices dealing with changes to the standards-making system.

How NFPA Standards Are Used

Association standards become more widely adopted each year as increasing numbers of government, insurance, and industry officials recognize the scope of America's tragic fire problem. Already millions of Americans are protected from fire each day by NFPA standards.

The miles of electrical wiring that run through homes and offices create an obvious potential fire hazard; however, the hazard is minimal since the installation of most electrical systems is governed by the NFPA's *National Electrical Code®* — the most widely accepted safety code in existence. The Association's *Life Safety Code®*, adopted for use by some two-thirds of the states, ensures that high-rise buildings, nursing homes, hospitals, theaters, and similar facilities are constructed for life safety from fire. The Code is now federal law for health-care facilities that receive Medicare or Medicaid benefits. (See "States That Have Adopted Model Building Codes" also in this Section.)

Scores of other NFPA standards have been referenced by the federal government's Occupational Safety and Health Administration, the Veterans Administration, the Department of Housing and Urban Development, and other federal agencies. (See "Federal Regulations that Reference NFPA Standards" that follows this article.)

SEQUENCE OF EVENTS LEADING TO PUBLICATION OF A COMMITTEE DOCUMENT

Technical Committee.
↓
Call for Proposals to amend existing document or for a new document.
↓
Committee meets to act on Proposals,
to develop its own Proposals, and to prepare its Report.
↓
Committee is balloted on action on Proposals. If ⅔rds approve, Report goes forward.
Lacking ⅔rds approval, Report returned to committee.
↓
Report is published for public review and comment (Technical Committee Reports).
↓
Committee meets to act on each public comment.
↓
Committee is balloted on action on comments. If ⅔rds approve, action
(Technical Committee Documentation) is published.
Lacking ⅔rds approval, action is returned to committee.
↓
NFPA meets and acts on Committee Report and TCD.
↓
Committee balloted on any amendments to Report approved at NFPA meeting.
↓
Standards Council decides whether or not to issue standard based on all evidence
before it or to take other action.

Why Are NFPA Standards so Widely Accepted?

NFPA develops "consensus" standards — those that are built on a foundation of maximum participation and substantial agreement by a broad variety of interests. This philosophy has led to the production of reasonable standards that provide adequate protection to the public, yet do not stifle design or development.

NFPA prides itself in supporting a flexible system that depends largely on volunteers and therefore produces firesafety standards at practically no cost to taxpayers. But the process doesn't stop with the completion of a standard. The rapid pace of technology requires frequent updating and the NFPA's system has a built-in mechanism for such regular, periodic updating. Finally, NFPA standards consistently have withstood judicial scrutiny, lending further credence to the Association's tradition of openness and fairness.

Monitoring the Process

NFPA continues to seek out and correct flaws in the standards-making process. The Association constantly keeps an eye open for potential unfairness and any possibility of legal violation.

This spirit of self-improvement has helped foster a successful, longstanding relationship between government and the private sector, avoiding the need for a costly federal standards-making machine. And the relationship will continue as NFPA continues to maintain a system based on widespread, voluntary participation and procedural fairness.

1984 Annual Meeting

July 30, 1982 — Notification to Secretary, Standards Council of Intent to Enter Cycle
January 14, 1983 — Proposal Closing Date
April 8, 1983 — Final Date for Committee to Meet on Report
April 8, 1983 — All Report Copy in Hands of Staff Liaison (ballots excepted)
April 29, 1983 — Final Date for Mailing Technical Committee Ballot
May 27, 1983 — Final Date for Mailing Correlating Committee Ballot
June 24, 1983 — Receipt of Ballots by Staff Liaison
August 19, 1983 — Committee Reports Mailed
November 4, 1983 — Comment Closing Date
November 14-17, 1983 — Fall Meeting (discussion of Committee Reports)
December 9, 1983 — Final Date for Committee to Meet on Documentation
December 9, 1983 — All Committee Documentation in Hands of Staff Liaison (ballots excepted)
December 16, 1983 — Final Date for Mailing Technical Committee Ballot
January 13, 1984 — Final Date for Mailing Correlating Committee Ballot
February 10, 1984 — Receipt of Ballots by Staff Liaison
March 23, 1984 — Committee Documentation Mailed
May 21-24, 1984 — Annual Meeting

1984 Fall Meeting

February 4, 1983 — Notification to Secretary, Standards Council of Intent to Enter Cycle
July 22, 1983 — Proposal Closing Date
October 14, 1983 — Final Date for Committee to Meet on Report
October 14, 1983 — All Report Copy in Hands of Staff Liaison (ballots excepted)
November 4, 1983 — Final Date for Mailing Technical Committee Ballot
December 2, 1983 — Final Date for Mailing Correlating Committee Ballot
December 30, 1983 — Receipt of Ballots by Staff Liaison
February 24, 1984 — Committee Reports Mailed
May 11, 1984 — Comment Closing Date
May 21-24, 1984 — Annual Meeting (discussion of Committee Reports)
June 8, 1984 — Final Date for Committee to Meet on Documentation

June 8, 1984 — All Committee Documentation in Hands of Staff Liaison (ballots excepted)
June 15, 1984 — Final Date for Mailing Technical Committee Ballot
July 13, 1984 — Final Date for Mailing Correlating Committee Ballot
August 10, 1984 — Receipt of Ballots by Staff Liaison
September 21, 1984 — Committee Documentation Mailed
November 12-15, 1984 — Fall Meeting

1985 Annual Meeting
July 29, 1983 — Notification to Secretary, Standards Council of Intent to Enter Cycle
January 13, 1984 — Proposal Closing Date
April 6, 1984 — Final Date for Committee to Meet on Report
April 6, 1984 — All Report Copy in Hands of Staff Liaison (ballots excepted)
April 27, 1984 — Final Date for Mailing Technical Committee Ballot
May 25, 1984 — Final Date for Mailing Correlating Committee Ballot
June 22, 1984 — Receipt of Ballots by Staff Liaison
August 17, 1984 — Committee Reports Mailed
November 2, 1984 — Comment Closing Date
November 12-15, 1984 — Fall Meeting (discussion of Committee Reports)
December 7, 1984 — Final Date for Committee to Meet on Documentation
December 7, 1984 -- All Committee Documentation in Hands of Staff Liaison (ballots excepted)
December 14, 1984 — Final Date for Mailing Technical Committee Ballot
January 11, 1985 — Final Date for Mailing Correlating Committee Ballot
February 8, 1985 — Receipt of Ballots by Staff Liaison
March 22, 1985 — Committee Documentation Mailed
May 13-16, 1985 — Annual Meeting

1985 Fall Meeting
January 27, 1984 — Notification to Secretary, Standards Council of Intent to Enter Cycle
July 13, 1984 — Proposal Closing Date
October 5, 1984 — Final Date for Committee to Meet on Report
October 5, 1984 — All Report Copy in Hands of Staff Liaison (ballots excepted)
October 26, 1984 — Final Date for Mailing Technical Committee Ballot
November 23, 1984 — Final Date for Mailing Correlating Committee Ballot
December 21, 1984 — Receipt of Ballots by Staff Liaison
February 15, 1985 — Committee Reports Mailed
May 3, 1985 — Comment Closing Date
May 13-16, 1985 — Annual Meeting (discussion of Committee Reports)
June 14, 1985 — Final Date for Committee to Meet on Documentation
June 14, 1985 — All Committee Documentation in Hands of Staff Liaison (ballots excepted)
June 21, 1985 — Final Date for Mailing Technical Committee Ballot
July 19, 1985 — Final Date for Mailing Correlating Committee Ballot
August 16, 1985 — Receipt of Ballots by Staff Liaison
September 27, 1985 — Committee Documentation Mailed
November 18-21 1985 — Fall Meeting

1986 Annual Meeting
August 3, 1984 — Notification to Secretary, Standards Council of Intent to Enter Cycle
January 18, 1985 — Proposal Closing Date
April 12, 1985 — Final Date for Committee to Meet on Report
April 12, 1985 — All Report Copy in Hands of Staff Liaison (ballots excepted)
May 3, 1985 — Final Date for Mailing Technical Committee Ballot

May 31, 1985 — Final Date for Mailing Correlating Committee Ballot
June 28, 1985 — Receipt of Ballots by Staff Liaison
August 23, 1985 — Committee Reports Mailed
November 8, 1985 — Comment Closing Date
Nov. 18-21, 1985 — Fall Meeting (discussion of Committee Reports)
December 13, 1985 — Final Date for Committee to Meet on Documentation
December 13, 1985 — All Committee Documentation in Hands of Staff Liaison (ballots excepted)
December 20, 1985 — Final Date for Mailing Technical Committee Ballot
January 17, 1986 — Final Date for Mailing Correlating Committee Ballot
February 14, 1986 — Receipt of Ballots by Staff Liaison
March 28, 1986 — Committee Documentation Mailed
May 19-22, 1986 — Annual Meeting

Standards Council

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What Each NFPA Standard Covers

The following guide to descriptions of NFPA Standards is arranged by subject. For example, if you need to know whether NFPA has developed a standard for ground ladders, look under the title "Fire Department Equipment." Under that heading, find "Fire Department Ground Ladders, NFPA 1931."

Atomic Energy

Facilities Handling Radioactive Materials, NFPA 801: Recommended practices dealing with practices aimed at reducing the risks of fire and explosion and minimizing the associated damage by radioactive contamination facilities handling radioactive materials. Recommendations apply to all locations, exclusive of nuclear reactors, where radioactive materials are stored, handled or used, including hospitals, laboratories, and industrial properties.

Nuclear Research Reactors, NFPA 802: Recommended practices for protection of life and property from fire in nuclear research reactor facilities.

Fire Protection for Nuclear Power Plants, NFPA 803: Standard covers the protection of nuclear electric generating facilities from the consequences of fire including safety to life, protection of property, and continuity of production. Provides guidance for those involved with design, construction, operation and protection.

Aviation

Standard for Aircraft Fuel Servicing, NFPA 407: Standard for fueling all types of aircraft on the ground, fueling hose, tank vehicles, airport fixed fueling systems. Additional guidance on static electricity and radar equipment. Updated with SI units.

Standard on Aircraft Maintenance, NFPA 410: Standard on aircraft electrical, oxygen and fuel systems; cleaning, painting and paint removal, welding, cabin cleaning and refurbishing operations. *Recommended Practice on Aircraft Interior Fire Protection Systems*, NFPA 421: Recommendations for aircraft interior fire detection and suppression systems.

Standard on Aircraft Hangars, NFPA 409: Standard covering specialized construction requirement and protection criteria for hangars designed to serve all types of aircraft.

Airport Fueling Ramp Drainage, NFPA 415: Standard on the water drainage system to control fuel spilled on ramp.

Airport Terminal Buildings, NFPA 416: Standard covering special construction and protection requirements for airport passenger terminals.

Aircraft Loading Walkways, NFPA 417: Standard on performance requirements to permit use under adverse fire exposure conditions covering construction features, protection methods.

Roof-Top Heliport Construction and Protection, NFPA 418: Fire protection standard for heliports on rooftops.

Recommended Practice for Master Planning Airport Water Supply Systems for Fire Protection, NFPA 419: Recommended practices covering methods of calculating and designing airport water supply systems for fire protection of all facilities regardless of ownership.

Aircraft Engine Test Facilities, NFPA 423: Firesafety standard covering location, construction, services, utilities, fire protection, operation, and maintenance for test cells, test stands, and engine run-up enclosures.

Recommended Practices for Aircraft Rescue and Fire Fighting, NFPA 402: Recommended practice for effective use of rescue and fire fighting equipment at airports.

Aircraft Rescue and Fire Fighting Services at Airports and Heliports, NFPA 403: Recommended practices for aircraft rescue and fire fighting services located on airports and heliports, including extinguishants, discharge rates, vehicle performance needs, manpower, and related subjects.

Manual on Aircraft Rescue and Fire Fighting Techniques for Fire Departments Using Structural Fire Apparatus and Equipment, NFPA 406M: Manual on fire control and rescue procedures for off-airport accidents where only structural fire apparatus is available.

Aircraft Fire Investigators' Manual, NFPA 422M: A "how-to" instructional manual.

Airport Emergency Planning, NFPA 424: Recommended practice covers all phases of emergency planning at airports.

Standard for Aircraft Hand Fire Extinguishers, NFPA 408: Standard on type, capacity, location needed for aircraft compartment protection.

Evaluating Foam Fire Fighting Equipment on Aircraft Rescue and Fire Fighting Vehicles, NFPA 412: Standard on field quality testing of foams for crash-rescue control.

Aircraft Rescue and Fire Fighting Vehicles, NFPA 414: Standard covering vehicular requirements for specialized airport-based rescue and fire fighting vehicles and fire extinguishing equipment utilized thereon.

Blower Systems

Blower and Exhaust Systems for Dust, Stock and Vapor Removal, NFPA 91: Standard covering fans, ducts, duct clearances, system design, dust collecting systems.

Boiler-Furnace Explosions

Fuel Oil- and Natural Gas-Fired Burner Boiler-Furnaces, NFPA 85A: Standard for single burner watertube and firetube boiler-furnaces rated at 10,000 pounds of steam per hour and above. Includes design, installation, operation and maintenance.

Natural Gas-Fired Multiple Burner Boiler-Furnaces, NFPA 85B: Standards for the design, installation and operation of these boiler-furnaces, their fuel-burning systems and related control equipment, including two-burner systems.

Fuel Oil-Fired Multiple Burner Boiler-Furnaces, NFPA 85D: Following general guidance and definitions, this standard outlines equipment requirements, sequencing of operations, interlock and alarm requirements, including two-burner systems.

Pulverized Coal-Fired Multiple Burner Boiler-Furnaces, NFPA 85E: Minimum standards for design, installation, operation of fuel-burning systems and related control equipment.

Pulverized Fuel Systems, NFPA 85F: Standard for the design, installation, operation, maintenance and personnel safety, covering area from the raw fuel bunker to where fuel enters furnace.

Implosions in Multiple Burner Boiler-Furnaces, NFPA 85G: Standard for the design, installation and operation of boiler-furnaces to prevent furnace implosions and to contribute to operating safety.

Building Construction

Air Conditioning and Ventilating Systems, NFPA 90A: Standard to restrict spread of smoke, heat and fire through duct systems, minimize ignition sources and permit system use for the additional purpose of emergency smoke control.

Warm Air Heating and Air Conditioning Systems, NFPA 90B: Standard on supply ducts, controls, clearances, heating panels, return ducts, air filters, heat pumps etc., for one- and two-family dwellings or spaces not exceeding 25,000 cu ft volume in any occupancy.

Roof Coverings, NFPA 203M: Recommended general information on roof coverings and their fire characteristics.

Guide for Smoke and Heat Venting, NFPA 204M: Guide offering information on principles, type of vents, venting ratios, curtain boards, inspection and maintenance, heat release data.

Guide for Plastics in Building Construction, NFPA 205M-T: A revision of a tentative guide adopted by the Association in 1972. Discusses the characteristics of plastics used in building construction which should be considered by designers, prospective users, and regulatory authorities concerned about firesafety.

Standard on Types of Building Construction, NFPA 220: Defines standard types of building construction and the terms "limited combustible" and "noncombustible" as applied to building construction materials.

Standard on Fire-Retardant Impregnated Wood and Fire-Retardant Coatings for Building Materials, NFPA 703: This standard describes treatments by pressure impregnation or by surface coatings.

Safeguarding Building Construction and Demolition Operations, NFPA 241: Standard on firesafety during erection, alteration and demolition.

Recommended Practice for Protection of Buildings from Exterior Fire Exposures, NFPA 80A: Recommended minimum requirements for protection against fire exposure.

Fire Doors and Windows, NFPA 80: Standard on the use, installation, and maintenance of fire doors, windows, glass blocks, shutters.
Guide on Building Areas and Heights, NFPA 206M: Directs attention to factors which may affect area and height limitations.

Carbon Dioxide

Carbon Dioxide Extinguishing Systems, NFPA 12: Standard on total flooding, local application and hose line systems.

Chemicals and Explosives

Standard on Fire Protection for Laboratories Using Chemicals, NFPA 45: This standard establishes basic requirements for the protection of life and property in laboratories handling hazardous chemicals. The standard is especially designed to protect persons from the effects of toxic, corrosive or otherwise potentially harmful chemicals to which they may be exposed as a result of fire or explosions.
Purged and Pressurized Enclosures for Electrical Equipment in Hazardous (Classified) Locations, NFPA 496: Standard for the design of equipment to eliminate or reduce a hazardous atmosphere.
Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1 Hazardous Locations, NFPA 493: Standard for the construction and evaluation of equipment of limited energy for use in hazardous locations.
Recommended Practice for Classification of Class I Hazardous Locations for Electrical Installations, NFPA 497: Recommended practice for classifying the zones of potential hazards from flammable atmospheres in chemical plants.
Code for Explosive Materials, NFPA 495: Covers reasonable regulations for safety in the manufacture, storage, transportation, and use of explosives and blasting agents of the type where common usage is incidental to mining, quarrying, road building, harbor improvement, and similar operations, including their usage on farms.
Standard on Explosives Motor Vehicle Terminals, NFPA 498: Standard for prevention or spreading of fires into explosives motor vehicle terminals or interchange lots.
Manual of Hazardous Chemical Reactions, NFPA 491M: Contains over 3,500 potentially dangerous chemical reactions reported in technical publications and by sources within the chemical field.
Hazardous Chemicals Data, NFPA 49: Chemicals included have one or more of the following criteria: a health hazard, a reactivity rating, an unusual storage or fire fighting problem. Data includes life and fire hazard precautions.
Standard for Cellulose Nitrate Motion Picture Film, NFPA 40: Standard provisions for the storage and handling of nitrate motion picture film. Includes data on film cabinets, vaults, archival vaults, projection, film exchanges, studios.
Storage of Liquid and Solid Oxidizing Materials, NFPA 43A: A code for reducing hazards from fires and explosions when liquid and solid oxidizing materials are in storage. Establishes four classes of oxidizing materials and storage requirements.
Code for the Storage of Gaseous Oxidizers, NFPA 43C: A code for reducing hazards from fires and explosions when gaseous oxidizing materials are in storage. Covers oxidizing materials which are gases at ambient temperatures or liquids having vapor pressures exceeding 40 psi at 100°F.
Code for Storage of Pesticides, NFPA 43D: A standard that can be applied to the commercial storage of pesticides both indoors and outdoors in containers under a 660-gallon capacity.

Storage of Pyroxylin Plastic, NFPA 40E: A code for safe storage of pyroxylin plastics in manufacturing buildings, warehouses, jobbing shops and retail outlets.

Code for the Storage of Ammonium Nitrate, NFPA 490: Storage in bags, drums and other containers and in bulk, with suggested regulations.

Chimneys and Other Heat and Vapor Removal Equipment

Chimneys, Fireplaces, Vents and Solid Fuel Burning Appliances, NFPA 211: Standard on safe installation and use in residential, commercial, and industrial applications.

Standard Glossary of Terms Relating to Chimneys, Vents and Heat-Producing Appliances, NFPA 97M: Definitions of terms to achieve uniformity in use.

Incinerators, Waste and Linen Handling Systems and Equipment, NFPA 8[illegible] Standard for installation and use of compactors, incinerators, waste and linen chutes, and disposal of waste.

Removal of Smoke and Grease-Laden Vapors from Commercial Cooking Equipment, NFPA 96: Standard on the design, installation and use of exhaust system components including hoods, grease removal devices, exhaust ducts, dampers air moving devices, auxiliary equipment, fire extinguishing equipment.

Combustible Metals

Processing, Handling and Storage of Magnesium, NFPA 48: Standard on fire and explosion hazards in magnesium foundries, processing plants, and the commercial storage of magnesium. Includes machining and fabrication, scrap handling, storage, fire protection.

Production, Processing, Handling and Storage of Titanium, NFPA 481: Standard covering properties and characteristics of titanium, sponge production, melting plants and mills, machine shops, powder production and use, special hazards, and fire control and extinguishment.

Production, Processing, Handling and Storage of Zirconium, NFPA 482: Standard covering flammable properties and explosive characteristics, uses of zirconium, fire prevention, dust collection, sludge, scrap disposal.

Cutting and Welding Practices

Fire Prevention in Use of Cutting and Welding Processes, NFPA 51B: Standard for management on fire prevention and protection precautions.

Dry Chemical Extinguishing Systems

Dry Chemical Extinguishing Systems, NFPA 17: Standard on total flooding, local application, hand hose line systems, with additional guidance on shutdown of normally heated hazards.

Dust Explosion Hazards

Manufacturing and Handling of Starch, NFPA 61A: Standard on hazards in handling dried starch and precautions to prevent ignition.

Grain Elevators, Bulk Grain Handling Facilities, NFPA 61B: Standard to prevent dust explosions and to minimize damage if an explosion should occur. Also covers fumigation of commodities and storage spaces.

Feed Mills, NFPA 61C: Standard construction, ventilation, equipment and miscellaneous precautions.

Agricultural Commodities, NFPA 61D: Standard for the prevention of fire and dust explosion hazards in milling of wheat, rye, barley, corn, etc.

Pneumatic Conveying of Agricultural Dusts, NFPA 66: Standard on pressure-type and suction-type systems with guidance on design safeguards of component parts of the pneumatic conveying equipment.

Dust Explosion Prevention in Plastics Industry, NFPA 654: Standard on reducing hazards in the manufacture, fabricating, molding of plastics, giving information on hazards of various plastics; a comprehensive appendix on plastic dust explosibility.

Prevention of Sulfur Fires and Explosions, NFPA 655: Standard on crushing and pulverizing hazards in handling bulk and liquid sulphur.

Also responsible for documents for the prevention, control and extinguishment of fires and explosions resulting from dusts which are not covered by other Technical Committees of the Project on Dust Explosion Hazards.

Aluminum Processing and Finishing, NFPA 65: Standard covering operations where fine metallic aluminum dust or powder is liberated.

Manufacture of Aluminum and Magnesium Powder, NFPA 651: Standard covering the manufacture of aluminum and magnesium flake powder, paste, or atomized granules. Also covers the manufacture of aluminum or magnesium alloys found to be explosive.

Prevention of Fires and Explosions in Wood Processing and Woodworking Facilities, NFPA 664: Standard for control of finely divided wood particles.

Electrical Equipment Maintenance

Recommended Practice for Electrical Equipment Maintenance, NFPA 70B: A recommended practice confined to preventive maintenance for industrial-type electrical systems and equipment to reduce hazards that result from their failure. Explains functions and economic considerations in establishing a preventive maintenance program.

Electrical Standard for Metalworking Machine Tools and for Plastics Processing Machinery, NFPA 79: Covers electric/electronic equipment, apparatus, systems, and wiring of an industrial machine tool, commencing at the place of connection of the supply to the machine tool electrical equipment; also electric equipment for use on circuits which operate from a supply voltage of 600 volts or less.

Electrical Safety Requirements for Employee Work Places

Standard for Electrical Safety Requirements for Employee Workplaces, NFPA 70E: Covers protection to the employee from electrical hazards such as shock, arc blasts and explosions initiated by electricity.

Electronic Computers Systems

Electronic Computer-Data Processing Equipment, NFPA 75: Covers requirements for installations of electronic computer/data processing equipment.

Explosion Protection Systems

Guide for Explosion Venting, NFPA 68: Provides information for the design and utilization of vents to limit pressures developed by explosions (deflagrations) of dusts or gases (vapors) in buildings, rooms, bins and equipment in order to prevent or reduce structural or mechanical damage.

Standard on Explosion Prevention Systems, NFPA 69: Covers the design, construction, operation, maintenance and testing of systems for: (a) reduction of oxidant concentration and control of combustible concentration in flammable mixtures, and (b) suppression of deflagrations.

Classification of Gases, Vapors and Dusts for Electrical Equipment in Hazardous (Classified) Locations, NFPA 497M: Manual lists the group classifications for selected gases, vapors, and dusts as specified in Article 500 of the *National Electric Code®*, to aid engineers in specifying the proper electrical equipment for hazardous (classified) locations.

Finishing Processes

Spray Application Using Flammable and Combustible Materials, NFPA 33: Covers the application of flammable or combustible materials when applied as a spray by compressed air, "airless" or "hydraulic atomization," or by steam, or electrostatic methods or by any other means in continuous or intermittent processes; also covers application of combustible powders when applied by powder spray guns, electrostatic powder spray guns, fluidized beds or electrostatic fluidized beds.

Dipping and Coating Processes Using Flammable or Combustible Liquids, NFPA 34: Applies to operations in which articles or materials are passed through contents of tanks, vats or containers of flammable liquids or combustible liquids.

Fire Department Equipment

Standard for Automotive Fire Apparatus, NFPA 1901: Covers design and construction requirements and minimum equipment regulations for fire department pumpers, aerial ladders, elevating platforms and tankers.

Testing Aerial Ladders and Elevating Platforms, NFPA 1904: Covers maintenance, care, testing and use of fire department aerial ladders and elevating platforms.

Portable Pumping Units, NFPA 1921: Covers requirements for maximum weight, operational characteristics, reliability of service and minimum performance of the different sizes of portable pumping units.

Fire Department Ground Ladders, NFPA 1931: Provides requirements for the construction, care and use of fire department ground ladders.

Fire Department Organization

Organization for Fire Services, NFPA 1201: Recommended organization, planning, fiscal management, public relations, fire prevention, investigation, etc., for municipal and private fire departments.

Recommendations for Organization of a Fire Department, NFPA 1202: Recommended legal basis for a fire deparment area, establishment of a governing body, fire department manpower and facilities, area resources, water supply.

Fire Hazards of Materials

Identification of the Fire Hazards of Materials, NFPA 704: Standard of key method to mark containers, indicating the reactivity, flammability, and health hazards of materials in storage.

Fire Hazards in Oxygen-Enriched Atmospheres

Manual on Fire Hazards in Oxygen-Enriched Atmospheres, NFPA 53M: Covers the fire and explosion hazards that may exist in oxygen-enriched atmospheres.

Fire Hose

Standards for Fire Hose, NFPA 1961: Covers construction of woven-jacketed, rubber-lined fire hose of either single or multiple jacket construction.
Care, Use, and Maintenance of Fire Hose, NFPA 1962: Covers the care, use and maintenance of fire hose, including connections and nozzles.
Screw Threads and Gaskets for Fire Hose Connections, NFPA 1963: Covers the dimensions for screw thread connections, gauges, gaskets, gasket seats and the size thread of threaded connections.

Fire Prevention Code

Fire Prevention Code, NFPA 1: General firesafety regulations and code enforcement and administration procedures used to complement the *National Fire Codes* in making them a complete fire prevention code. Includes guidelines for the development of local legislation for the enactment of a fire prevention code.

Fire Reporting

Uniform Coding for Fire Protection, NFPA 901: Provides terminology and a classification system for fire incident data which improves uniformity of data collected and used at the local government level, allows comparison of data between communities and allows aggregation of data on state and national levels for studying the fire problem.
Fire Reporting Field Incident Manual, NFPA 902M: Guide for use by the fire department officer when completing his report of an incident.
Fire Reporting Property Survey Manual, NFPA 903M: Manual which describes the completion of two forms - NFPA 903SR, "Basic Structure Report" and NFPA 903TR "Basic Occupancy Report."
Incident Follow-Up Report Manual, NFPA 904M: Manual containing instructions for the completion of the "Incident Follow-Up Report," Form 9041.
Investigation of Fires of Electrical Origin, NFPA 907M: Provides fire officers and fire investigators with guidelines and techniques for use in investigating fires to determine when a fire is of electrical origin.

Fire Safety in Racetrack Stables

Standard on Fire Safety in Racetrack Stables, NFPA 150: Covers requirements for construction, fire protection and occupancy of racetrack stable areas.

Fire Service Occupational Safety and Health

Standard for Fire Department Safety Officer, NFPA 1501: Outlines the duties and responsibilities of a Fire Department Safety Officer. Requires all fire departments to have a safety officer.

Fire Service Professional Standards Development Committee for Fire Fighter Qualifications

Standard for Fire Fighter Professional Qualifications, NFPA 1001: Identifies the professional levels of competence required of fire department members and covers the entrance requirements and first three levels of progression thereafter.
Fire Apparatus Driver/Operator, NFPA 1002: Identifies the professional levels of competence required of fire apparatus driver/operators. Covers requirements for drivers, and driver/operators of fire department pumpers, aerial apparatus, and elevating platform apparatus.
Standard for Airport Fire Fighter Professional Qualifications, NFPA 1003: Identifies the professional levels of competence required of the Airport Fire Fighter.

Fire Service Professional Standards Development Committee for Fire Inspector and Investigator Qualifications

Standard for Professional Qualifications for Fire Inspector, Fire Investigator & Fire Prevention Education Officer, NFPA 1031: Identifies the professional levels of competence required of personnel involved in fire inspection, fire investigation or fire prevention education work. Covers the requirements for three levels of progression.

Fire Service Professional Standards Development Committee for Fire Instructor Qualifications

Standard for Fire Service Instructor Professional Qualifications, NFPA 1041: Identifies the professional levels of competence required of fire service instructors.

Fire Service Professional Standards Development Committee for Fire Service Officer Qualifications

Fire Officer Professional Qualifications, NFPA 1021: Identifies the professional levels of competence required for fire department officers and covers the requirements for each of the six levels of progression.

Fire Service Training

Recommended Practice for Training Reports and Records, NFPA 9: Recommended systematic approach for officers who must develop a fire training records system for the fire department.
Fire Department Operations in Properties Protected by Sprinkler and Standpipe Systems, NFPA 13E: Recommended procedures for fire department operations in

properties protected by automatic sprinklers, outside sprinkler systems for exposure protection, standpipe systems.

Training Standards on Initial Fire Attack, NFPA 1410: Method of measuring how effective the fire department's evolutions are and how effective the fire attack can be.

Guide for Training Fire Department Personnel to Inspect Dwellings, NFPA 1452: Provides the fire department training officers or other fire service personnel with a guide to the establishment of a Dwelling Fire Safety Program for their own community.

Fire Tests

Fire Test of Building Construction and Materials, NFPA 251: Applicable to assemblies of structural materials for buildings. *Fire Tests of Door Assemblies*, NFPA 252: Testing fire resistance of door assemblies in wall openings.

Flooring Radiant Panel Test, NFPA 253: Testing flame spread of floor covering systems when exposed to a flaming ignition source in a radiant heat energy environment.

Test of Surface Burning Characteristics of Building Materials, NFPA 255: Standard to evaluate flame spread over the surface, fuel contributed, smoke developed.

Fire Tests of Roof Coverings, NFPA 256: Standard measuring relative fire characteristics of roof coverings when fire originates outside the building. Test for intermittent flame exposure, flame spread, burning brands, flying brands, and prolonged exposure to weather.

Fire Test of Window Assemblies, NFPA 257: Tests of glass block and other light transmitting assemblies.

Standard Test Method for Measuring Smoke Generated by Solid Materials, NFPA 258: Test procedure for measuring smoke generated by solid materials in thickness up to and including 1 inch. Measurement conducted by attenuation of a light beam by smoke accumulating within a closed chamber due to nonflaming pyrolytic decomposition and flaming combustion. Results are expressed in terms of specific optical density. Test intended for research and development, not as a basis of rating for building purposes.

Standard Test Method for Potential Heat of Building Materials, NFPA 259: A standard test method providing a means of determining, under controlled laboratory conditions, the total potential release of heat of materials under defined fire exposure conditions.

Standard Methods of Tests and Classification System for Cigarette Ignition Resistance of Components of Upholstered Furniture, NFPA 260A: Standard test methods and classification system to evaluate the cigarette ignition resistance of upholstered furniture used in non-commercial, non-institutional, non-public assembly, non-educational occupancies.

Standard Method of Test for Determining Resistance of Mock-Up Upholstered Furniture Material Assemblies to Ignition by Smoldering Cigarettes, NFPA 260B: Standard test method to evaluate the cigarette ignition resistance of composite mock-ups of upholstered furniture used in occupancy groups such as hospitals, nursing homes, residential-custodial care and supervisory care facilities such as educational, assembly, or residential occupancies.

Fire Tests for Flame-Resistant Textiles and Films, NFPA 701: Flame-resistance requirements and test methods.

Standard Method for the Flammability of Wearing Apparel, NFPA 702: Provides methods for testing flammability of textiles used or intended for use in wearing apparel, establishes classes of flammability, and sets forth requirements which textiles shall meet to be so classified.

Most of these standards are also Standards of the American Society of Testing and Materials and Underwriters Laboratories, Inc., with essentially the same text but different identifying numbers.

Firesafety for Mobile Homes

Standard for Firesafety Criteria for Mobile Home Installations, Sites and Communities, NFPA 501A: Covers the installation of mobile homes, including mobile home park requirements.

Firesafety for Recreational Vehicles

Standard on Firesafety Criteria for Recreational Vehicles, NFPA 501C: Covers plumbing, heating and electrical systems and firesafety and life safety for travel trailers, motor homes, camping trailers and truck campers.

Standards for Firesafety Criteria for Recreational Vehicle Parks and Campgrounds, NFPA 501D: Provides construction requirements and use of land areas designated for recreational vehicle parks.

Firesafety Symbols

Standard Fire Protection Symbols for Architectural and Engineering Drawings, NFPA 172: Covers fire protection symbols for use by architects and engineers in the design of buildings and building sites.

Standard Fire Protection Symbols for Risk Analysis Diagrams, NFPA 174: Covers fire protection systems for use in the analysis of fire risk by insurance companies, engineering consultants and fire departments.

Standard Symbols for Fire Fighting Operations, NFPA 178: Presents standard references and symbols for visual alerting of firefighters during fire-related emergencies.

Fixed Guideway Transit Systems

Standard on Fixed Guideway Transit Systems, NFPA 130: Covers fire protection and life safety requirements for underground, surface and elevated fixed guideway transit systems, including trainways, vehicles, transit stations, and vehicle maintenance and storage areas.

Flammable Liquids

Standard for Fire Hazard Properties of Flammable Liquids, Gases and Volatile Solids, NFPA 325M: Tabulation of some 1,500 substances, listed alphabetically by chemical names, 500 synonyms.

Basic Classification of Flammable and Combustible Liquids, NFPA 321: Standard terms of flash and boiling points.

Drycleaning Plants, NFPA 32: Standard safeguards incident to drycleaning and dry dyeing.

Flammable and Combustible Liquids Code, NFPA 30: Applies to all flammable and combustible liquids except those that are solid at 100°F or above. Covers tank storage, piping, valves and fittings, container storage, industrial plants, bulk plants, service stations and processing plants.

Flammable and Combustible Liquids on Farms and Isolated Construction Projects, NFPA 395: Covers the storage on farms or in rural areas of flammable and combustible liquids having a flash point below 200°F and the storage of flammable and combustible liquids on farms, rural road construction and other rural earth-moving projects where it is customary to obtain fuels in bulk and dispense or transfer them under control of the owner or contractor.

Standard on Installation of Oil Burning Equipment, NFPA 31: Covers minimum requirements for safety to life and property from fire in the installation of oil burners and the equipment used in connection with them.

Manufacture of Organic Coatings, NFPA 35: Applies to facilities and processes used for the manufacture of protective and decorative finishes or coatings for industrial, automotive, marine, transportation, institutional, household and other purposes.

Cleaning or Safeguarding Small Tanks and Containers, NFPA 327: Procedures for the safe removal of flammable vapors, liquids, gases, or solids from small tanks or containers that cannot be entered. Such procedures are to safely permit welding or cutting or other work which may create a potential fire or explosion hazard.

Leakage from Underground Flammable Liquid Tanks, NFPA 329: Recommendations for detection, testing, locating.

Flammable and Combustible Liquids and Gases in Manholes and Sewers, NFPA 328: Provides guidance to enforcement officials, fire authorities, contractors and owners of underground structures on the problems involving flammable and combustible liquids and gases which may be found in underground structures. Typical case histories of explosions in underground structures given.

Solvent Extraction Plants, NFPA 36: Covers the commercial scale solvent extraction processing of animal and vegetable oils and fats by the use of flammable solvents, except extraction processes employing liquefied petroleum gases.

Tank Vehicles for Flammable and Combustible Liquids, NFPA 385: Applies to tank vehicles used for transportation of asphalt or normally stable flammable and combustible liquids with a flash point below 200°F; covers the design and construction of cargo tanks and their appurtenances.

Portable Shipping Tanks, NFPA 386: Transportation of flammable and combustible liquids in tanks of larger than 60 gallons and up to 660 with flash point below 200°F.

Foam

Foam Extinguishing Systems and Combined Agent Systems, NFPA 11: Standard for inside hazards, exterior storage tanks, spray foam systems, monitor and hose systems.

Medium and High Expansion Foam Systems, NFPA 11A: Covers minimum requirements for the installation of medium and high expansion foam systems.

Mobile Foam Apparatus, NFPA 11C: Applies to mobile foam apparatus used for the control and extinguishment of flammable and combustible liquids fires in storage tanks and other locations involving the risk of spills of flammable liquids.

Wetting Agents, NFPA 18: Covers requirements for the performance and use of wetting agents as related to fire control and extinguishment.

Forest

Homes and Camps in Forest Areas, NFPA 224: Offers guidance on area fire protection, structural features, electrical equipment, heating and cooling equipment, fire protection, camper's rules.

Wildfire Control and Environmental Improvement, NFPA 295: Offers advice on organization and planning, hand tools, power-operated equipment, pumps, chemicals, care of equipment.

Garages and Parking Structures

Standard for Parking Structures, NFPA 88A: Covers construction and protection of parking garages.

Standard for Repair Garages, NFPA 88B: Covers construction and protection of repair garages.

Halogenated Fire Extinguishing Systems

Halon 1301 Fire Extinguishing Systems, NFPA 12A: Covers minimum requirements for halogenated agent fire extinguishing systems for the use and guidance of those charged with the purchasing, designing, installing, testing, inspecting, approving, listing, operating and maintaining of such systems.

Halon 1211 Fire Extinguishing Systems, NFPA 12B: Covers minimum requirements for halogenated agent extinguishing systems for the use and guidance of those charged with the purchasing, designing, installing, testing, inspecting, approving, listing, operating and maintaining of these systems.

Health Care Facilities

Standard for the Use of Inhalation Anesthetics, NFPA 56A: Provides requirements to protect against explosions or fires, electric shock, mechanical injury from compressed gases or compressed gas cylinders, or anoxia from erroneous gas connections.

Standard for the Use of Inhalation Anesthetics in Ambulatory Care Facilities, NFPA 56G: Covers requirements to protect against fires, electric shock and mechanical injury from compressed gases in ambulatory care facilities.

Manual on Health Care Emergency Preparedness, NFPA 3M: Manual recommending methods for writing a disaster plan for health care facilities.

Standard for Essential Electrical Systems for Health Care Facilities, NFPA 76A: Covers minimum requirements for the design, installation, operation, and maintenance of those portions of the electrical systems of health care facilities whose interruption would jeopardize the effective and safe care of institutionalized patients.

Standard for Hyperbaric Facilities, NFPA 56D: Applies to hyperbaric chambers and associated facilities which are used, or intended to be used, for medical applications or experimental procedures at pressures from 0 psig to 100 psig (14.7 psia to 114.7 psia).

Standard for Hypobaric Facilities, NFPA 56E: Covers minimum safeguards for the protection of personnel in facilities containing an oxygen-enriched atmosphere and operated at pressures less than 760 mmHg.

Safety Standard for Laboratories in Health-Related Institutions, NFPA 56C: Covers the protection against fire and explosion hazards created by laboratory activities in hospitals and health-related institutions.

Recommended Practice on Medical-Surgical Vacuum Systems in Hospitals, NFPA 56K: Provides information for the safe use of medical-surgical vacuum systems and practical advice on the design, installation, testing and maintenance of centrally-piped medical-surgical vacuum systems so that they are efficient, reliable and of adequate capacity.

Standard for Respiratory Therapy, NFPA 56B: Applies to the use of nonflammable medical gases, vapors and aerosols and the equipment required for their administration, at normal atmospheric pressure. (NFPA 56B is submitted to the Committee on Industrial and Medical Gases for concurrence before submittal to the Association for action.)

Manual for Home Use of Respiratory Therapy, NFPA 56HM: Manual giving requirements for the safe use of respiratory therapy equipment in the home.

Standard on the Safe Use of Electricity in Patient Care Areas of Hospitals, NFPA 76B: Covers hazards related to use in health care facilities of electric appliances; reliance on grounding systems; new appliances for diagnosis, therapy and monitoring; and new techniques that invade the body's natural barriers to electric shock. Covers other hazards also inherent to electric appliances in this specialized environment.

Recommended Practice on the Safe Use of High Frequency Electricity in Health Care Facilities, NFPA 76C: Covers the design and use of electrical and electronic appliances generating high-frequency currents for medical treatment in hospitals, clinics, ambulatory care facilities and dental offices.

Industrial and Medical Gases

Bulk Oxygen Systems at Consumer Sites, NFPA 50: Covers the installation of bulk oxygen systems on industrial and institutional consumer premises.

Gaseous Hydrogen Systems at Consumer Sites, NFPA 50A: Covers the general principles recommended for the installation of gaseous hydrogen systems on consumer premises where the hydrogen supply to the consumer premises originates outside the consumer premises and is delivered by mobile equipment.

Liquefied Hydrogen Systems at Consumer Sites, NFPA 50B: Covers the general principles recommended for the installation of liquefied hydrogen systems on consumer premises where the liquid hydrogen supply to the consumer premises originates outside the consumer premises and is delivered by mobile equipment.

Oxygen-Fuel Gas Systems for Welding and Cutting, NFPA 51: Covers the installation and operation of oxygen fuel gas welding and cutting systems.

Acetylene Cylinder Charging Plants, NFPA 51A: Covers the design, construction and installation of acetylene cylinder charging plants.

Nonflammable Medical Gas Systems, NFPA 56F: Covers the installation and testing of nonflammable medical gas piping systems in hospital and non-hospital based facilities.

(NFPA 56F is submitted to the Health Care Facilities Correlating Committee for concurrence before submittal to the Association for action.)

Industrial Trucks

Fire Safety Standard for Powered Industrial Trucks Including Type Designations, Areas of Use, Maintenance and Operations, NFPA 505: Applies to fork truck, tractors, platform lift trucks, motorized hand trucks and other specialized industrial trucks powered by electric motors or internal combustion engines.

Internal Combustion Engines

Stationary Combustion Engines and Gas Turbines, NFPA 37: Covers the installation and operation of stationary combustion engines and gas turbines; also covers portable engines which remain connected for use in the same location for one week or more used instead of or to supplement stationary engines.

Libraries, Museums and Historic Buildings

Protection of Libraries and Library Collections, NFPA 910: Recommended practices with case histories, new construction and guidance to safeguard lives and property.

Protection of Museums and Museum Collections, NFPA 911: Guidance for trustees, curators, directors, building superintendents and other staff members on life safety and protection of collections.

Lightning Protection

Lightning Protection Code, NFPA 78: Covers lightning protection requirements for ordinary buildings, miscellaneous structures and special occupancies, heavy-duty stacks and structures containing flammable liquids and gases.

Liquefied Natural Gas

Production, Storage and Handling of Liquefied Natural Gas, NFPA 59A: Covers the design, location, construction and operation of facilities for the liquefication of natural gas and the storage, vaporization, transfer, handling and truck transport of liquefied natural gas.

Liquefied Petroleum Gas

Standard for Storage and Handling of Liquefied Petroleum Gases, NFPA 58: Covers the design, construction, installation and operation of all LP-Gas systems.
Liquefied Petroleum Gases at Utility Gas Plants, NFPA 59: Covers utility gas plants for the design, construction, location, installation and operation of refrigerated and non-refrigerated liquefied petroleum gas systems.

Loss Prevention Procedures and Practices

Private Fire Brigades, NFPA 27: Recommendations on organizing, managing, training, inspection, maintenance and equipment.
Guard Service in Fire Loss Prevention, NFPA 601: Standard on guard service management, functions, and communications, as well as on guard selection and training.
Guard Operations in Fire Loss Prevention, NFPA 601A: Gives basis for instructing guards and defining their duties.

Marine Fire Protection

Standard for the Control of Gas Hazards on Vessels, NFPA 306: Covers vessels carrying or burning combustible or flammable liquids, carrying or having carried flammable compressed gases, chemicals in bulk or other products capable of creating a hazardous condition.
Marinas and Boatyards, NFPA 303: Berthing and repair facilities and operational hazards.
Standard for the Construction & Protection of Piers and Wharves, NFPA 87: Covers the construction and protection of piers and wharves.

Motor Craft

Motor Craft, NFPA 302: Covers the prevention of fuel leakage, the elimination of possible sources of vapor ignition from particularly dangerous locations, the provision of adequate means for keeping vital areas ventilated at all times, the avoidance of unnecessary use of combustible materials in exposed locations and the provision of proper fire extinguishing equipment.
Vessels during Construction, Repair and Lay-Up, NFPA 312: Standard for prevention, prompt discovery, retarding spread and extinguishment of fires.

Mining Facilities

Standard for the Prevention of Dust Explosions in Coal Preparation Plants, NFPA 653: Covers only plants designed to prepare or condition coal for marketing.
Standard on Fire Protection for Mobile Surface Mining Equipment, NFPA 121: Covers

minimum requirements for safeguarding life and property against fire and related hazards associated with surface self-propelled mobile mining equipment.

Motor Vehicle and Highway Fire Protection

Recommended Practice on Fire Protection for Limited Access Highways, Tunnels, Bridges, Elevated Roadways, and Air Right Structures, NFPA 502: Recommended practice intended primarily for the guidance of those individuals responsible for the construction, operation, maintenance and fire protection of limited access highways, tunnels, bridges, elevated roadways and air right structures.

Standard for Truck Fire Protection, NFPA 512: Covers minimum requirements for fire protection measures for property-carrying motor vehicles.

Standard for Motor Freight Terminals, NFPA 513: Covers requirements for the prevention of loss of life and property damage from fires in motor freight terminals.

National Electrical Code®

National Electrical Code®, NFPA 70: Covers electric conductors and equipment installed within or on public and private buildings or other structures, including mobile homes and recreational vehicles and other premises such as yards, carnivals, parks and other lots and industrial substations; conductors that connect the installations to a supply of electricity; and other outside conductors on the premises.

Electrical Code for One- and Two-Family Dwellings, NFPA 70A: Excerpted and edited from most recent edition of NFPA 70. Covers Code regulations for installation of electrical services in dwellings.

National Fuel Gas Code

National Fuel Gas Code, NFPA 54: General criteria for the installation, operation and maintenance of gas piping, gas appliances and nonspecialized gas equipment on residential, commercial and industrial premises for use with fuel gases, manufactured gas, LP-Gas in the vapor phase, LP-Gas-air mixtures, or mixtures of these gases (including mixtures within the flammable range) at pressures up to and including 60 psi.

Ovens and Furnaces

Ovens and Furnaces, NFPA 86A: Standard covering "Class A" ovens or furnaces - heat utilization equipment operating at approximately atmospheric pressures and at temperatures below 1400°F and where there is an explosion hazard from either, or a combination of, the fuel in use, flammable volatiles from materials in the ovens, or catalytic combustion systems. Requirements on location, construction, heating system, ventilation, safety control equipment, fire protection.

Industrial Furnaces, NFPA 86B: Standard covering "Class B" furnaces which are those operating at approximately atmospheric pressures and temperatures exceeding approximately 1400°F. Standard deals with location, construction, heating systems, ventilation, safety controls and fire protection considerations.

Industrial Furnaces Using a Special Processing Atmosphere, NFPA 86C: Standard covering "Class C" furnaces which utilize a special processing atmosphere, including salt baths, utilizing any type of heating system. Requirements on location, construction, heating system, safety control equipment, operation and fire protection.

Industrial Furnaces Using Vacuum as an Atmosphere, NFPA 86D: Standard applies to

"Class D" industrial furnaces - those operating at temperatures above ambient to over 5000°F and at pressures normally below atmosphere. Covers design, construction and protection of vacuum furnaces.

Portable Fire Extinguishers

Standard for Portable Fire Extinguishers, NFPA 10: Covers minimum requirements for the selection, installation, inspection, maintenance and testing of portable extinguishing equipment.
Model Enabling Act for the Sale or Leasing and Servicing of Portable Fire Extinguishers, NFPA 10L: Regulations on portable fire extinguisher sales and servicing to aid in safeguarding lives and property.

Protective Equipment for Fire Fighters

Standard on Protective Clothing for Structural Fire Fighting, NFPA 1971: Covers protective clothing for structural fire fighting worn for protection against extremes of temperature, steam, hot water, hot particles and other hazards encountered during fires and related life saving.
Structural Fire Fighters' Helmets, NFPA 1972: Applies to helmets utilized for structural fire fighting.
Gloves for Structural Fire Fighters, NFPA 1973: Covers performance criteria, testing, sizing and construction for gloves to be worn by structural fire fighters.
Self-Contained Breathing Apparatus for Fire Fighters, NFPA 1981: Specifies Self-Contained Breathing Apparatus for structural fire fighting and other conditions where respiratory hazards are encountered, or where the potential for such hazards exists.
Personal Alert Safety System (PASS) for Fire Fighters, NFPA 1982: Covers performance criteria and testing for PASS devices designed to audibly signal for assistance if a fire fighter needs help or becomes incapacitated.

Public Fire Service Communications

Standard for Public Fire Service Communications, NFPA 1221: Covers the installation, maintenance and use of all public fire service communications.

Pyrotechnics

Code for the Manufacture, Transportation, and Storage of Fireworks, NFPA 44A: Code on safety precautions in the manufacture of fireworks, and protection should accident occur.
Model State Fireworks Law, NFPA 1121L: An act to prohibit the sale, offering or exposing for sale of fireworks. The Act defines "fireworks" and regulates the manner of using fireworks with penalties for violation of the provisions of the Act.
Code for Unmanned Rockets, NFPA 1122: Provides safe outlets to the experimental urges of the general public regarding rockets, to discourage the making and use of dangerous homemade rocket devices and to discourage experimentation with explosive or highly energetic propellant materials.
Public Display of Fireworks, NFPA 1123: Requirements for construction, handling, and use of public display fireworks, including site selection criteria and requirements for operation of the display. (In cooperation with the Standards Council.)

Safety to Life

Life Safety Code®, NFPA *101* (formerly the Building Exits Codes): Deals with life safety from fire and similar emergencies. Covers construction, protection and occupancy features to minimize danger to life from fires, smoke, fumes or panic before buildings are vacated.

Tents, Grandstands and Air-Supported Structures Used for Places of Assembly, NFPA 102: Covers the construction, location, protection and maintenance of tents and air-supported structures used for places of assembly; temporary, permanent and portable grandstands and bleachers; interior folding or telescopic seating normally used in gymnasiums, multi-use rooms and similar indoor mass seating.

Signaling Systems

Standard for Central Station Signaling Systems, NFPA 71: Covers the installation, maintenance and use of central station signaling systems.

Standard on Automatic Fire Detectors, NFPA 72E: Covers minimum requirements for the performance, location, mounting, testing and maintenance of automatic fire detectors for protection of the occupant, building, space, structure, area or object to be protected in accordance with the stated purpose.

Standard for Household Fire Warning Equipment, NFPA 74: Covers requirements for selection, installation, operation and maintenance of fire warning equipment for use within family living units.

Standard for Local Protective Signaling Systems, NFPA 72A: Covers the installation, maintenance and use of local protective signaling systems for guard's tour, fire alarm and supervisory service.

Auxiliary Protective Signaling Systems, NFPA 72B: Covers the installation, maintenance and use of auxiliary protective signaling systems for fire alarm service.

Standard for Remote Station Protective Signaling Systems, NFPA 72C: Covers electrically supervised circuits employing a direct circuit connection between signaling devices at the protected premises and signal receiving equipment in a remote station.

Standard for Proprietary Signaling Systems, NFPA 72D: Covers the installation, maintenance and use of proprietary protective signaling systems for guard, fire alarm and supervisory service.

Static Electricity

Recommended Practice on Static Electricity, NFPA 77: Covers methods for control of static electricity for the purpose of eliminating or mitigating its fire hazard.

Storage

Standard for Fur Storage, Fumigation and Cleaning, NFPA 81: Protection standard for fur storage vaults and fur cleaning plants.

General Storage, NFPA 231: Applies to storage of materials representing the broad range of combustibles 30 feet or less in height in buildings protected by automatic sprinklers.

Standard for Rack Storage of Materials, NFPA 231C: Applies to storage of materials representing the broad range of combustibles stored over 12 feet in height on racks.

Standard for the Protection of Records, NFPA 232: Covers minimum requirements for records protection equipment and records handling techniques that provide protection from hazards of fire.

Manual for Fire Protection for Archives and Record Centers, NFPA 232AM: Guidance on protection for file rooms of 50,000 cubic feet in volume to largest known archives or record centers.

Recommended Safe Practices for Storage of Forest Products, NFPA 46: Recommends steps to minimize hazards and control fire in storage areas containing lumber, timber, wood chips, logs, and similar products at industrial sites, major storage facilities and retail or wholesale yards.

Standard for Storage of Rubber Tires, NFPA 231D: Covers the storage of rubber tires when stored indoors.

Water Cooling Towers

Water Cooling Towers, NFPA 214: Covers fire protection considerations for field-erected water cooling towers.

Water Extinguishing Systems

Sprinkler Systems, NFPA 13: Covers minimum requirements for the installation of sprinkler systems for fire protection in buildings and the character and adequacy of water supplies to sprinkler systems.

Care and Maintenance of Sprinkler Systems, NFPA 13A: Covers the care and maintenance of sprinkler systems.

Sprinkler Systems for One- and Two-Family Dwellings and Mobile Homes, NFPA 13D: Covers the design and installation of automatic sprinkler systems for one- and two-family dwellings and mobile homes.

Installation of Closed-Head Foam-Water Sprinkler Systems, NFPA 16A: Recommended practice for the design, installation and maintenance of closed-head foam-water systems using standard sprinkler systems.

Centrifugal Fire Pumps, NFPA 20: Covers minimum requirements for centrifugal fire pumps, including single stage and multistage pumps of horizontal or vertical shaft design and the design, installation and maintenance of these pumps, pump drivers and associated equipment.

Operation and Maintenance of Steam Fire Pumps, NFPA 21: Applies to National Standard steam fire pumps.

Standard for the Installation of Deluge Foam-Water Sprinkler Systems and Foam-Water Spray Systems, NFPA 16: Covers minimum requirements for the installation of foam-water sprinkler systems.

Installation of Private Fire Service Mains and Their Appurtenances, NFPA 24: Details of yard piping supplying automatic sprinkler systems, yard hydrants, standpipes, etc.

Supervision of Valves Controlling Water Supplies for Fire Protection, NFPA 26: Recommended practices for identification, supervision, valve seals and tags, valve index boards.

Fire Flow Testing and Marking of Hydrants, NFPA 291: Recommended testing procedure, classification and color coding.

Standpipe and Hose Systems, NFPA 14: Covers minimum requirements for the installation of standpipe and hose systems for buildings and structures.

Water Spray Fixed Systems for Fire Protection, NFPA 15: Covers the design, installation, maintenance and testing of water spray fixed systems.

Water Tanks, NFPA 22: Covers requirements for the design, construction, installation and maintenance of tanks and accessory equipment supplying water for private fire protection.

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Oxidizing Materials, Liquid and Solid Storage of, 43A, Vol 2
Oxygen Systems, Bulk, at Consumer Sites, 50, Vol 2
Oxygen-Enriched Atmospheres, Fire Hazards in, 53M, Vol 7
Parking Structures, 88A, Vol 5
Pesticides in Portable Containers, 43D, Vol 2
Piers and Wharves, 87, Vol 4
Plastics Industry, Dust Explosions in, 654, Vol 3
Private Fire Service Mains, 24, Vol 1
Property Survey Manual, 903M, Vol 8
Pulverized Fuel Systems, 85F, Vol 4
Pumping Units, Portable, 1921, Vol 6
Pyroxylin Plastic, 40E, Vol 2
Racetrack Stables, 150, Vol 5
Rack Storage of Materials, 231C, Vol 5
Radioactive Materials, Facilities Handling, 801, Vol 8
Records, Protection of, 232, Vol 5
Recreational Vehicle Parks, 501D, Vol 6
Recreational Vehicles, 501C, Vol 6
Respiratory Therapy, 56B, Vol 5
Respiratory Therapy, Home Use, 56HM, Vol 5
Rockets, Code for Unmanned, 1122L, Vol 8
Roof Coverings, 203M, Vol 8
Roof Coverings, Fire Tests of, 256, Vol 5
Rubber Tires, Storage of, 231D, Vol 5
Self-Contained Breathing Apparatus, 1981, Vol 6
Signaling Systems, Auxiliary Protective, 72B, Vol 4
Signaling Systems, Central Station, 71, Vol 4
Signaling Systems, Local Protective, 72A, Vol 4
Signaling Systems, Proprietary Protective, 72D, Vol 4
Signaling Systems, Remote Station, 72C, Vol 4
Smoke Generated by Solid Materials, Std. Research Test for Measuring, 258, Vol 5
Smoke and Heat Venting, 204, Vol 8
Solvent Extraction Plants, 36, Vol 2

Spray Application Using Flammable and Combustible Materials, 33, Vol 2
Sprinkler Systems, Care, Maintenance, 13A, Vol 7
Sprinkler Systems, Installation of, 13, Vol 1
Sprinkler Systems, One- and Two-Family Dwellings, 13D, Vol 1
Standpipe and Hose Systems, 14, Vol 1
Starch Manufacturing and Handling, 61A, Vol 3
Static Electricity, 77, Vol 8
Storage, Baled Cotton, 231E, Vol 8
Storage, General Indoor, 231, Vol 5
Sulfur Fires Explosions, Prevention, 655, Vol 3
Symbols (Fire Protection) for Architectural and Engineering Drawings, 172, Vol 8
Symbols (Fire Protection) for Risk Analysis Diagrams, 174, Vol 8
Tanks, Containers, Small, Cleaning, 327, Vol 2
Tents and Air-Supported Structures, Assembly Seating, 102, Vol 5
Terminals, Motor Freight, 513, Vol 6
Textiles and Films, Flame Resistant Tests for, 701, Vol 6
Titanium, Handling and Storage, 481, Vol 2
Training Reports and Records, 9, Vol 7
Transit Systems, Fixed Guideway, 130, Vol 5
Truck Fire Protection, 512, Vol 6
Vessels, Control of Gas Hazards on, 306, Vol 5
Vessels, Protection During Construction, Repair and Lay-up, 312, Vol 5
Warm Air Heating and Air Conditioning Systems, 90B, Vol 5
Water Spray Fixed Systems, 15, Vol 1
Water Supplies, Suburban and Rural Fire Fighting, 1231, Vol 6
Water Supplies, Valves Controlling, 26, Vol 7
Water Tanks for Private Fire Protection, 22, Vol 1
Wearing Apparel, Flammability, 702, Vol 6
Wetting Agents, 18, Vol 1
Wildfire Control, Volunteer Fire Departments, 295, Vol 1
Window Assemblies, Fire Tests of, 257, Vol 5
Wood Processing and Woodworking, Dust Explosion, 664, Vol 3
Zirconium, Production, Processing, 482, Vol 2

Federal Regulations That Reference NFPA Standards

This list shows the extent to which NFPA standards become part of federal regulatory law and, thus, constitute legal obligations. These obligations appear in a number of ways: some are outright mandates (e.g. OSHA rules) while others serve as compliance criteria that condition the receipt of a federal benefit (e.g., HHS/HCFA).

In addition to regulatory use of NFPA standards by the agencies listed, the General Services Administration, the State Department, the Secret Service, and all the military departments utilize the *National Fire Codes*® for purposes of government real property management and may condition leasing of private property for government purposes by compliance, e.g., with provisions of the *Life Safety Code*®. This, however, is not regulatory use. Similarly, the Nuclear Regulatory Commission references a number of NFPA standards in its "Regulatory Guides." These, however, do not have the force of law; they merely present an option for compliance. The Department of Agriculture, U.S. Forest Service, also utilizes NFPA standards for purposes of forest firesafety management. Again, this does not constitute regulatory use.

Titles for standards are listed following the federal regulations listings of NFPA adoptions.

NFPA Standard Number	CFR Number
Department of Energy	
Residential Energy Conservation Program	
NFPA 31-1978	456.905
	.906
	.907
	.909
	.913
NFPA 54.1974 (Part I)	456.905
	.906
	.907
	.909
	.914
NFPA 70-1978	456.914
	.705
NFPA 211-1977	456.905
	.906
	.907
	.909
	.912
24 CFR Subtitle B, Chapter II	
Department of Housing and Urban Development: Federal Housing Commissioner*	
Minimum Property Standards (MPS)	
NFPA 10-1978	200-299
NFPA 13-1975	″
NFPA 14-1978	″
NFPA 31-1978	″
NFPA 54-1980	″
NFPA 58-1979	″
NFPA 70-1981	″
NFPA 72A-1979	″
NFPA 72B-1979	″
NFPA 72C-1975	″
NFPA 72D-1979	″
NFPA 72E-1978	″
NFPA 80-1977	″
NFPA 82-1977	″
NFPA 90A-1976	″
NFPA 90B-1980	″
NFPA 101-1976	″
NFPA 211-1980	″
NFPA 252-1979	″
NFPA 253-1978	″
NFPA 701-1977	″

NFPA Standard Number	CFR Number
Intermediate MPS for Solar Heating and Domestic Hot Water Systems	
NFPA 30-1978	200-299
NFPA 89M-1976	″
NFPA 321-1976	″
24 CFR Chapter XX	
Department of Housing and Urban Development: Office for Neighborhoods, Voluntary Associations and Consumer Protection	
Mobile Home Standards	
NFPA 31-1974	3280.703
NFPA 54-1974	3280.703
NFPA 58-1974	3280.703
	3280.704(b)(5)
NFPA 70-1975	3280.801(b)
	3280.808(a)
NFPA90B-1973	3280.703
29 CFR Chapter XVII	
Department of Labor: Occupational Safety and Health Administration	
Part 1910	
NFPA 30-1969	1910.178
NFPA 32-1970	1910.106
NFPA 33-1969	1910.94
NFPA 34-1966	1910.94
NFPA 35-1970	1910.106
NFPA 36-1967	1910.106
NFPA 37-1970	1910.106
	.110
NFPA 51B-1962	1910.252
NFPA 54-1969	1910.110
NFPA 54A-1969	1910.110
NFPA 58-1969	1910.168
	.178
NFPA 59-1968	1910.110
NFPA 62-1967	1910.263
NFPA 68-1954	1910.94
NFPA 70-1971	1910.66
	.68
	.94
	.103
	.178
NFPA 78-1968	1910.109
NFPA 80-1968	1910.106
NFPA 80-1970	1910.252
NFPA 86A-1969	1910.107
	.108
NFPA 91-1961	1910.107
NFPA 91-1969	1910.108
NFPA 96-1970	1910.110
NFPA 101-1970	1910.261
NFPA 203M-1970	1910.109
NFPA 251-1969	1910.106
NFPA 302-1968	1910.265
NFPA 385-1966	1910.106
NFPA 496-1967	1910.103

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*A rulemaking proceeding in progress as of late 1983 would eliminate direct reference to the above NFPA standards and would, instead, rely upon model building codes in force in various jurisdictions. Accordingly, NFPA standards would constitute Minimum Property Standards only to the extent that the various model building codes reference the NFPA standards. A final rule is expected to be promulgated by the Department of Housing and Urban Development in early 1984.

NFPA Standard Number	CFR Number
NFPA 505-1969	1910.110 .189
NFPA 566-1965	1910.252
NFPA 656-1959	1910.263
Part 1926	
NFPA 10A-1970	1926.150
NFPA 13-1969	1926.152
NFPA 30-1969 (Ch. III and IV only)	1926.152
NFPA 70-1971	1928.151 .351 .400 .401 .404 .803
NFPA 80-1969	1926.152
NFPA 385-1966	1926.152
30 CFR Chapter I	
Department of Labor: Mine Safety and Health Administration	
NFPA 11A-1970	75.1107-16
NFPA 13-1969	75.1101-7
NFPA 13A-1971	75.1107-16
NFPA 15-1969	75.1107-16
NFPA 17-1969	75.1107-16
NFPA 22-1971	75.1107-3; 75.1107-13
NFPA 30-1969	57.4-4 77.1103
NFPA 60-1961	77.301
NFPA 70-1968	55.12-45 55.12-48 56.12-45 56.12-48 57.12-45 57.12-48 75.513-1 75.518-1 77.301-1 77.503-1 77.506-1 77.516 77.901
NFPA 72A-1967	75.1103-2 75.1107-4 75.1107-16
NFPA 198-1969	75.1107-16
NFPA 252-1972	57.2
33 CFR Chapter I	
Department of Transportation: Coast Guard	
NFPA 11A-1976	149.481
NFPA 12-1977	149.481
NFPA 12A-1977	149.481
NFPA 13-1978	149.481
NFPA 70-1981 (Articles 310 and 400)	183.435
NFPA 72A-1975	149.541
NFPA 407-1975 (Chapter 6)	149.213
33 CFR Chapter II	
Department of the Army: Corps of Engineers	
NFPA 70-1981	222.5
38 CFR Chapter I	
Veterans Administration: (Adoption via HUD Minimum Property Standards)	
NFPA 10-1978	36.4360
NFPA 13-1975	"
NFPA 14-1978	"
NFPA 31-1978	"
NFPA 54-1980	"
NFPA 58-1979	"
NFPA 70-1981	"
NFPA 72A-1979	"
NFPA 72B-1979	"
NFPA 72C-1975	"
NFPA 72D-1979	"
NFPA 72E-1978	"
NFPA 80-1977	"
NFPA 82-1977	"
NFPA 90A-1976	"
NFPA 90B-1980	"
NFPA 101-1976	"
NFPA 211-1980	"
NFPA 252-1979	"
NFPA 253-1978	"
NFPA 701-1977	"
40 CFR Chapter 1	
Environmental Protection Agency	
NFPA 30-1981	264.198(b) 265.198(b)
42 CFR Chapter I	
Department of Health and Human Services: Public Health Services	
NFPA 56F-1977	52b.11(b)(3)
NFPA 70-1981	Part 36, Subpart H, App. A(e) 52b.11(e)
NFPA 101-1976	Part 36, Subpart H, App. A(c), 51c.503 (a)(7)(iii)(B)-52b.11(c); 52b.11(d)
42 CFR Chapter IV	

NFPA Standard Number	CFR Number
Health Care Financing Administration	
NFPA 101-1981	405.1022(b); 405.1134(a); 442.321(a); 442.507
NFPA 220-1979	442.323(b)(1); 442.509
45 CFR Chapter XIII	
Department of Health and Human Services: Office of Human Development Services	
NFPA 101-1976	1321.123(b) 1328.35(b)
46 CFR Subchapter D	
Department of Transportation: Coast Guard	
NFPA 306-1975	35.01-1
Subchapter F	
NFPA 70-1981	63.05-85 63.10-85
NFPA 302-1980 Part I, Sec. 23 only	58.10-5
Subchapter H	
NFPA 56A-1973	72.05-10
NFPA 306-1980	71.60-1
49 CFR Chapter I	
Department of Transportation: Research and Special Programs Administration *Hazardous Materials Regulations*	
NFPA 58-1972	71.7; 173.315
Pipeline Safety Regulations	
NFPA 30-1977	192.735 193.2149 193.2813
NFPA 37-1979	193.2147
NFPA 51B-1977	193.2811
NFPA 58-1979	192.11
NFPA 59-1979	192.11
NFPA 59A-1972	193.2005
NFPA 59A-1979	193.2073 193.2141 193.2213 193.2819 193.2821
NFPA 70-1978	192.163 192.167 193.2141 193.2427 193.2433 193.2805
Subchapter R	
NFPA 306-1980	167.30-1
Subchapter T	
NFPA 70-1981	183.01-10 183.05-45 183.05-50 183.10-20
Subchapter U	
NFPA 306-1975	189.50-1
Subchapter I	
NFPA 306-1980	91.50-1
Subchapter I-A	
NFPA 306-1980	109.573
NFPA 407-1980	108.239
NFPA 496-1974	108.187
Subchapter J	
NFPA 56A-1973	110.10-1; 111.80-20
NFPA 70-1981	110.10-1; 111.50-15; 111.80-5
Subchapter N	
NFPA 57-1973	147A.11
NFPA 70-1981	148.29-35
Subchapter Q	
NFPA 255-1972	164.012-1

ABBREVIATED TITLES FOR STANDARDS

10	Fire Extinguishers, Portable
11A	Foam Systems, High Expansion
12	Carbon Dioxide Extinguishing Systems
12A	Halon 1301 Fire Extinguishing Systems
13	Sprinkler Systems, Installation
13A	Sprinkler Systems, Care, Maintenance
14	Standpipe and Hose Systems
15	Water Spray Fixed Systems
17	Dry Chemical Extinguishing Systems
22	Water Tanks for Private Fire Protection
30	Flammable and Combustible Liquids Code
31	Oil Burning Equipment, Installation of
32	Drycleaning Plants
33	Spray Application Using Flam & Combust Mat
34	Dipping and Coating Processes Using Flammable or Combustible
35	Organic Coatings, Manufacture of
36	Solvent Extraction Plants
37	Combustion Engines and Gas Turbines
51B	Cutting and Welding Processes, Usage of
54	Fuel Gas Code, National
56A	Inhalation Anesthetics
56F	Gas Systems, Nonflammable Medical
57	Fumigation
58	Liquefied Petroleum Gases, Storage and Handling
59	Liquefied Petroleum Gases at Utility Gas Plants
59A	Liquefied Natural Gas, Storage and Handling
60	Pulverized Coal Systems
62	Pulverizing Cocoa and Sugar
68	Explosion Venting
70	Electrical Code, National
72A	Signaling Systems, Local Protective
72B	Signaling Systems, Auxiliary Protective
72C	Signaling Systems, Remote Station Protective
72D	Signaling Systems, Proprietary Protective
72E	Fire Detectors, Automatic
78	Lightning Protection Code
80	Fire Doors and Windows
82	Incinerators, Waste and Linen Handling Systems and Equipment
86A	Ovens and Furnaces, Design, Location and Equipment
89M	Heat Producing Appliances, Clearances for
90A	Air Conditioning and Ventilating Systems
90B	Warm Air Heating and Air Conditioning Systems
91	Blower and Exhaust Systems, Dust, Stock, Vapor
96	Cooking Equipment, Vapor Removal from
101	Life Safety Code
198	Care of Fire Hose
203M	Roof Coverings
211	Chimneys, Vents, Fireplaces, and Solid Fuel Burning Appliances
220	Building Construction, Standard Types of
251	Building Construction and Materials, Fire Tests of
252	Door Assemblies, Fire Tests of
253	Floor Covering Systems, Critical Radiant Flux Test for
255	Building Materials, Test of Surface Burning Characteristics
302	Motor Craft
306	Vessels, Control of Gas Hazards on
321	Flammable and Combustible Liquids, Classification of
385	Flammable and Combustible Liquids, Tank Vehicles for
407	Aircraft Fuel Servicing
496	Electrical Equipment, Purged and Pressurized Enclosures for
505	Industrial Trucks, Powered
566	Bulk Systems of Oxygen
656	Prevention of Dust Ignitions in Spice Grinding Plants
701	Textiles and Films, Flame Resistant Tests for

National Fire Protection Association

An Overview

The National Fire Protection Association (NFPA), organized in 1896, has as its mission the safeguarding of man and his environment from destructive fire, using scientific and engineering techniques and education. Incorporated in 1930 under laws of the Commonwealth of Massachusetts, the Association has its headquarters in Quincy, Massachusetts.

NFPA is an independent, voluntary membership, nonprofit (tax-exempt) organization. A 28-member Board of Directors has general charge of the affairs of the Association, which has a staff of some 135 professional men and women plus a slightly smaller number of support personnel.

NFPA is financed principally by membership dues, sales of its publications and audiovisual materials, income from seminars, research grants, and contributions.

Membership in NFPA totals approximately 32,000 individuals and 150 national trade and professional organizations from more than 85 nations. Members are drawn from fire departments (24 percent), business and industry (18 percent), health care facilities (17 percent), insurance (10 percent), architects and engineers (7 percent), federal, state, and local government (6 percent), fire equipment manufacturers and distributors (5 percent), educational facilities (3 percent), trade and professional associations (2 percent), and other fields (8 percent).

Membership

Membership in the National Fire Protection Association is open to everyone who wishes to share in the NFPA goal of improving the level of firesafety in all phases of modern life. Both voting and non-voting memberships are available.

The annual membership dues are $50.00 per person and include a subscription to the bimonthly magazine *Fire Journal*® and to the newsletter *Fire News*. These two periodicals are available only to members of the Association; they are not sold on an individual subscription basis. In addition, members are entitled to reduced rates for the monthly magazine *Fire Service Today*®, the quarterly publication *Fire Technology*, and the Standards Information Service. The annual *Fire Protection Reference Directory*, at $10.00 per copy, is available to NPFA members without charge. All print, film, and audiovisual products are offered to members at a discount off the regular list price.

Section Membership Each NFPA member is entitled to join one of the eleven membership Sections free of charge; there is a small additional fee for anyone wishing to join more than one Section. Sections have their own officers, meetings, and newsletters, and serve as forums for the exchange of information on specific fire protection problems and interests. The eleven Sections and their officers are listed later in this section.

Codes and Standards NFPA Codes and Standards are developed by approximately 175 Technical Committees comprised of some 2,400 experts who serve voluntarily, representing a balance of interests. Members have an opportunity to take part in this democratic process by voting on the documents developed, revised, updated, and otherwise prepared by the Technical Committees. Together, NFPA codes and standards comprise the *National Fire Codes®*, published annually, and each document is also available in a separate booklet edition. A booklet detailing NFPA membership services and benefits is available on request from the NFPA Membership and Subscriptions Department, Batterymarch Park, Quincy, MA 02269; (617) 328-9290.

Voting Voting on NFPA codes and standards is limited to current, paid-up members of NFPA. Members must join the Association at least 180 days prior to the opening of any regular meeting to be eligible to vote at that meeting. Voting occurs twice a year, at the NFPA Annual Meeting in May and the Fall Meeting in November. Votes apply to each new code and standard; to revisions of existing documents; and to withdrawal or reconfirmation of existing documents.

Meetings

The four-day NFPA Annual Meeting and Fire Safety Exhibit is held in May, with an average attendance of 6,000 persons. The Fall Meeting, which also lasts four days and attracts some 1,200 persons, occurs each November. Meetings are held in varying locations throughout the United States; some take place in Canada; and one, thus far, has been in Europe. Lectures, discussions, voting on Technical Committee documents, NFPA Section meetings, conduct of other Association business, and special events make up the meeting programs. Registration is open to all who are interested, although only voting members may vote.

Activities

Activities of NFPA generally fall into two broad, interrelated areas: technical and educational. The basic technical activity involves development, publication, and dissemination of timely consensus standards intended to minimize the possibility and effects of fire in all aspects of contemporary life. Efforts are also directed to educate the general public of all ages to avoid loss of life and property from fire by abiding by the standards and by making good firesafety habits a way of life.

Technical

After adopted by the NFPA membership at either an Annual or a Fall Meeting, and issued by the Standards Council, standards are published and made available for voluntary adoption. The standards have great influence because they are widely used as the basis of legislation and regulation at all levels of government, from local to national. Many are referenced by agencies of the federal government (see the section on Standards) such as in the regulations of the Occupational Safety and Health Administration (OSHA); the documents also are used by insurance authorities for risk evaluation and premium rating.

Technical advisory services are provided on both a formal and informal basis to anyone legitimately concerned with fire-related problems. Within the Engineering Services Division are five special Field Services, each established to provide guidance in the application of pertinent standards. These Field Services are: Electrical, Flammable Gases, Flammable Liquids, Life Safety Code, and Marine. Through its Marine Chemist Qualification Board, the Association administers the NFPA Certificated Marine Chemist program. Technical staff members of the Division also serve as instructors, lecturers, and panelists on a variety of firesafety programs of organizations based all over the globe.

Similarly, the Public Protection Division provides information resources to the fire service. Staff members advise individual fire departments on application of NFPA standards pertaining to the fire service, and take part in training programs and conferences for fire department personnel throughout North America and abroad.

The Association's technical and general interest publications program ranges across the fire protection spectrum. In addition to publishing its own standards and codes, NFPA also publishes handbooks, reference books, textbooks, training manuals, audiovisual packages, and films.

As the nation's independent center of fire information, NFPA maintains the Charles S. Morgan Technical Library. This up-to-date reference collection includes books (4,700), technical reports (11,000), periodicals (440 titles), standards and pamphlets (20,000), topical files (4,000), items in microfilm (10,500) and various audiovisual materials.

The Association maintains offices in Washington, DC, for close liaison with agencies of the federal government, as well as with NFPA's Washington-based organization members. Administrators and other staff of the Association frequently are asked to present expert testimony before Congressional committees and at other federal hearings. Through its Washington-based International Division, NFPA also provides liaison and assistance to the world community and to the Association's members in more than 85 countries outside the U.S.

Educational

"Learn Not to Burn®" is the theme and focus of NFPA's broad public firesafety education program, which includes a national media campaign, a firesafety curriculum for school children, and an extensive outreach program supported by a regional field network of NFPA representatives. (See the article on "Learn Not to Burn" in this section.) NFPA serves as the national sponsor of Fire Prevention Week each October. The Association also produces posters, booklets, flyers and children's items that teach personal, home, and on-the-job firesafety. For more than 30 years, Sparky the Fire Dog has appeared in many of the materials produced for children.

Through its Continuing Education Division, NFPA conducts seminars on fire-related problems and solutions. These seminars concern interpretation and application of codes and standards, plus application of state-of-the-art fire protection technology to any fire-related area. Current seminars support the *Life Safety Code®* (NFPA *101®*) and the *National Electrical Code®* (NFPA 70) and present state-of-the-art fire protection technology in the areas of detention and correctional occupancies, hotels/motels, health care facilities, and shipyards.

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Got a Question?

The following list will help direct you to the appropriate NFPA department or staff person when you contact the NFPA with a question or request. Mailing address: NFPA, Batterymarch Park, Quincy, MA 02269. Telephone: (617) 770-3000.

Advertising: Denise Babcock, Manager

Customer Service (NFPA Publications): Paul Carey, Asst. to Division Director
Phone orders, requests, or order problems 617/770-3500(direct line)

Contracted Courses Information: Dave Novak, Manager for Seminars and Workshops, Division for Continuing Education

Education Programs: Judith Comoletti, Public Education Assistant
Learn Not To Burn Curriculum, network, etc.

Film and Audiovisuals: Marybeth Hartnett, Secretary
Films in production

Fire Data: Jon Jones, Manager, Fire Data Services

Fire Journal: Jerry W. Laughlin, Editor
Bi-monthly member magazine

Fire News: Catherine G. Cronin, Editor
Member newsletter, 8 times per year

Fire Service Today: Joyce Keefe, Editor
Monthly magazine for the fire service

Fire Technology: Gordon McKinnon, Editor-in-Chief, Editorial Division
Quarterly publication for technical articles, reports on the fire field.

International Operations: NFPA Washington Office, 202/484-8200

Legal questions: Dennis Berry, Associate General Counsel
Copyrights, product permission, etc.

Library Services: Dorinda Fergason, Fire Information Specialist

Annual and Fall Meeting Programs: Kenneth E. H. Backman, Director, External Affairs
Program content

Meetings and Seminars: Meetings information and seminar registration: Seminar Registrar, Meetings Department; Other Seminar Information: Dave Novak, Manager for Seminars and Workshops

Membership: Barbara Evans, Manager
Questions on delivery of member and subscription periodicals, member dues, section verification, etc.

Public Affairs: Sheri Pitts, Secretary
Public information/media relations

Publication Orders: 617/770-3500(direct line)

Standards System Administration: Leona Taraskiewicz, Coordinator
Non-technical questions

Washington Operations: Letitia Killerlane, Secretary. (202) 484-8200
For government actions related to the NFPA

Fire Service-Related Questions

Fire fighter qualifications
Fire Prevention Code
Rural fire protection

Robert C. Barr, Division Director
Public Protection Division

Arson investigation
Fire inspector and fire investigator qualifications
Fire investigation
Investigation of fires of electrical origin

Robert E. Carter

Fire service instructor qualification
Fire service officer qualifications
Fire service training
Forest Fire Service
Liaison with other fire service training Organizations and advisory services

James V. McKiernan

Fire department organization
Fire protection educators accreditation
Fire reporting
Firesafety symbols
Fire service management systems, including UFIRS and FIRS systems

Carl E. Peterson

Liaison with fire service organizations and government agencies

Joseph M. Redden, Ass't. Vice President, Government Affairs

Aviation fire protection (aircraft fueling and maintenance, aircraft rescue and fire fighting, airport facilities)
Fire department equipment and apparatus
Occupational safety and health in the fire service
Protective equipment for fire fighters
Fire Department/Fireground Operations
Bruce W. Teele

Technical Questions about Fire Protection

Boilers and furnaces
Fossil fueled steam electric generating stations
Hydroelectric stations
Industrial trucks
Mines
Nuclear energy
Ovens and furnaces
Rapid transit systems
Waste water treatment facilities
Water cooling towers

John Anderson

Chemicals
Combustible metals
Explosion protection
Explosives
Fireworks
Industrial loss prevention
Plastics
Pyrotechnics

Robert Benedetti

Air conditioning
Building construction
Fire doors and windows
Incinerators, waste and linen handling
Solid fuel heating appliances
Vapor removal from commercial cooking equipment

John Bouchard

Electricity
National Electrical Code®, NFPA 70

John Caloggero
Peter Schram
Joe Tedesco

Firesafety Symbols
Fire tests
Life Safety Code®, NFPA 101®

Ron Cote'

Flammable liquids

Martin Henry

Extinguishing systems (water, foam)
Fire pumps
Foam systems
Forest products
Fur storage
General storage
Rack storage
Record protection
Rubber tires
Standpipe systems
Underground piping
Water spray
Water tanks

Robert Hodnett

Marine

Charles Keller

Health care facilities

Burton Klein

Life Safety Code®, NFPA 101®
Parking garages
Repair garages

James Lathrop

Gases

Wilbur Walls

Detectors
Electronic computers
Emergency power supplies
Extinguishing systems (halon, dry chemical, CO_2)
Libraries, museums, historic buildings
Lightning protection
Mobile homes, RVs, dwellings
Portable extinguishers
Signaling systems and fire detectors

Charles Zimmerman

NFPA Membership Sections

Within the Voting Membership are 11 Sections. Oldest is the Fire Marshals Association of North America, founded in 1906 and reorganized in 1927 as the Fire Marshals Section of NFPA. Other Sections, in order of their founding, are Electrical (1948), Railroad (1963), Industrial Fire Protection (1963), Fire Service (1973), Chief Electrical Inspectors (founded in 1974 as the National Association of Chief Electrical Inspectors), Health Care (1976), Fire Science and Technology Educators (1976), Aviation (1980), and Education (1981).

All NFPA Sections, except the Fire Marshals Section, are based at NFPA Headquarters, Batterymarch Park, Quincy, MA 02269; (617) 770-3000. The Fire Marshals Section is based in the NFPA Washington Office, Capital Gallery Suite 220, 600 Maryland Ave. SW, Washington, DC 20024; (202) 484-8200. The sections with their respective executive officers and secretaries (all secretaries are full-time NFPA staff) are listed here.

Architects, Engineers and Building Code Officials Section

Chairman: Elliott S. Guttman
Vice President/Facilities Engineering & Construction, Catherine McAuley Health Ctr., P.O. Box 992, Ann Arbor, MI 48106

Secretary: Hugo Heyns
AIA Chief Architect, Dept. of Public Safety, Office of the State Fire Marshal, 9131 Interline Ave., Bldg C, Baton Rouge, LA 70809

Executive Secretary: John R. Anderson
National Fire Protection Assn., Batterymarch Park, Quincy, MA 02269 (617) 770-3000

Aviation Section

Chairman: James O'Regan
President, Feecon Corp., P.O. Box 338, Westboro, MA 01581

Vice Chairman: Arnold Sloane
Staff Airport Engineer, Airport Emergency Operations, Port Authority of NY and NJ, One World Trade Center, Rm. 65S, NY, NY 10048

Secretary: Richard Clarke
Manager, Design Safety, Renton Division, Boeing Commercial Airline Co., P.O. Box 3707, MS 69-14, Seattle, WA 98124

Executive Secretary: Robert C. Barr
National Fire Protection Assn., Batterymarch Park, Quincy, MA 02269 (617) 770-3000

Chief Electrical Inspectors' Section (National Association of Chief Electrical Inspectors)

President: Robert E. Barnett
Dept. of Administrative Services, Division of Facilities Construction & Management, State of Utah, 4110 State Office Building, Salt Lake City, UT 84114

First Vice-President: James I. Burgess
Greensboro Inspection Dept., Drawer W2, Greensboro, NC 27402

Second Vice-President: Charles R. Pierce
P.O. Box 1368, Fresno, CA 93716

Secretary: Leo F. Martin
Deputy Bldg. Commissioner, City Hall, Rm. 807, Boston, MA 02201

Executive Secretary: Peter J. Schram
National Fire Protection Assn., Batterymarch Park, Quincy, MA 02269 (617) 770-3000

Education Section

Chairman: Stephen A. Jensen
Phoenix Fire Dept., 620 W. Washington St., Phoenix, AZ 85003

Vice-Chairman: Hugh Graham
Route 1, Box 26A Atoka, OK 74525

Secretary: Meredith K. Appy
Factory Mutual Engineering, 1151 Boston-Providence Turnpike, Norwood, MA 02062

Executive Secretary: Corinne Broderick
National Fire Protection Assn., Batterymarch Park, Quincy, MA 02269 (617) 770-3000

Electrical Section

Chairman: Richard G. Biermann
Biermann Electric Co. Inc., 2300 University Ave., Des Moines, IA 50311

Secretary: Peter J. Schram
National Fire Protection Assn., Batterymarch Park, Quincy, MA 02269 (617) 770-3000

Fire Marshals Section

(See separate listing under Fire Marshals Association of North America, Joint Council of National Fire Service Organizations.)

Fire Science and Technology Educators Section

Chairman: John A. Campbell
Gage-Babcock & Associates, 1135 Fairview, Lombard, IL 60148

Vice-Chairman: Lawrence F. Rice
Fire Science Coordinator, Middlesex Community College, Springs Rd., Bedford, MA 01730

Secretary: Dr. Fred C. Sutton
Assistant Dean of Career Technology, Cuyahoga Community College, 2900 Community College Ave., Cleveland, OH 44115

Executive Secretary: Carl E. Peterson
National Fire Protection Assn., Batterymarch Park Quincy, MA 02269 (617) 770-3000

Fire Service Section

Chairman: Vincent J. Bollen
Captain, FDNY, 625 East 14th St., Apt. 11B, NY, NY 10009

Vice-Chairman: James M. Turner
Battalion Chief, LA County Fire Dept., 24875 N. San Fernando Rd., Newhall, CA 91321

Secretary: Timothy G. Stillman
Broward County Fire Dept., 60 Hendricks Isle, Ft. Lauderdale, FL 33301

Executive Secretary: James V. McKiernan
National Fire Protection Assn., Batterymarch Park, Quincy, MA 02269 (617) 770-3000

Health Care Section

Chairman: Edward Ferrell
Birmingham Regional Hospital Council, Birmingham, AL 35206

Vice-Chairman: Donald C. Bedell
Circle B Enterprises, Inc., Sikeston, MO 63801

Secretary: Thomas Jaeger
Gage-Babcock and Associates, Inc., Vienna, VA 22180

Executive Secretary: Burton R. Klein
National Fire Protection Assn., Batterymarch Park, Quincy, MA 02269 (617) 770-3000

Industrial Fire Protection Section

Chairman: Bruce Gray
Manager, Service Center, West Point-Pepperell, P.O. Box 217, Langdale, AL 36864

Vice-Chairman: John E. Luley
Loss Control Administrator, Potomac Electric Power Co., 1900 Pennsylvania Ave., NW, Washington, DC 20068

Secretary: John T. Higgins
Supervisor, Safety & Security, Dow Corning Corp., Midland, MI 48640

Executive Secretary: John K. Bouchard
National Fire Protection Assn., Batterymarch Park, Quincy, MA 02269 (617) 770-3000

Railroad Section

Chairman: Anthony L. Braden
Senior Manager of Casualty Prevention Programs, The Chessie System, 100 N. Charles St., Baltimore, MD 21201

Vice-Chairman: Roger K. Fitch
Fire Protection Engineer, Union Pacific Railroad, 1416 Dodge St., Omaha, NE 61879

Secretary: Charles E. Zimmerman
National Fire Protection Assn., Batterymarch Park, Quincy, MA 02269 (617) 770-3000

Learn Not to Burn®

Learn Not to Burn® serves as the credo for NFPA's extensive public education and awareness efforts that reach millions of people around the world each year. During the course of more than 85 years of firesafety research, investigation, and advocacy, the Association has been concerned that death and loss from fire continue to happen despite the best efforts at rectifying structural causes through codes and standards. It is clear that only by educating people to recognize the hazards in their everyday lives and to respond properly in emergencies can we hope to save lives and property from destruction by fire. To help achieve this goal, NFPA created the Learn Not to Burn program as a way to educate large numbers of people using a variety of formats to teach actions they could take as individuals to prevent fires and to protect themselves in fire situations.

National Media Campaign

An important and widely recognized aspect of the program is the national media campaign that uses television, radio, and print messages to teach people how to Learn Not to Burn.

In studies conducted on behalf of NFPA, it was recommended that these messages stress information and repetition rather than impression. People did not want to be preached to; rather, they wanted to be taught firesafety information through short, concise messages.

In 1975, the Public Service Council began coordinating NFPA's Learn Not to Burn television firesafety campaign. The Council distributes firesafety spots through a network of field contacts who have the responsibility for placing them with the local media. The local television station airs the spots free-of-charge as a public service to its viewing audience.

Twenty-three television public service announcements have been produced featuring actor Dick Van Dyke. These short, 30 second spots stress the positive behavioral approach to take when faced with a fire situation. They tell people *what to do*, rather than what not to do.

During 1983, the total number of lives saved as a result of the firesafety lessons learned from these television messages reached 116. They were not only from within the United States. The manager of a guest house in New Zealand safely evacuated forty-five guests when a fire broke out in the early morning hours. He attributed his calm, deliberate actions to the Dick Van Dyke television spots.

In addition to television, NFPA's radio messages have been aimed at specific target audiences. Actor Vincent Price, former chairman of the U.S. Department of Interior's Indian Arts and Crafts Board, recorded five radio spots to help combat the severe fire problem in American Indian communities. Also, several leading black celebrities and entertainers have recorded messages that address fire problems of the inner city resident.

Media Campaign Kit

A successful strategy to support the Learn Not to Burn Campaign is the media campaign kit. Based upon a single firesafety behavior and timed for availability when a new Learn Not to Burn television spot is distributed, the campaign kit includes print ads and radio messages to reinforce the particular television spots. The first kit was released in August 1982 for the Stop, Drop, and Roll message. In 1983 two new kits were distributed, one focusing on Crawl Low in Smoke, the other on Home Escape Planning. When used within the community, the kits promote a total firesafety awareness campaign based upon the Learn Not to Burn messages.

Learn Not to Burn Curriculum

Another major component of the Learn Not to Burn program is a firesafety curriculum for use at the elementary school level. The Learn Not to Burn Curriculum is currently in use in some 27,000 classrooms nationwide. Among the major areas now using the program are Memphis, Phoenix, Fort Worth, Houston, San Francisco, San Diego, and Nassau County, New York. The Learn Not to Burn Curriculum is also a part of the school program in areas throughout the states of Alaska, New York, and Oklahoma.

NFPA developed the Curriculum based upon the results of a comprehensive study of firesafety education. The study revealed that while individual states, communities, and some national organizations have attempted to create fire prevention curricula, there was little coordination between fire departments and school districts; almost no coherent continuity in firesafety education from grade to grade; extremely uneven participation by school personnel in the fire education process, and in regard to the curricula themselves, an absence of educational objectives and relationship to other elements of the school program.

The Learn Not to Burn Curriculum was released after four years of vigorous development and field testing. The testing process involved more than 4,700 students in experimental/control settings in seven locations across the country.

Firesafety Behaviors

The Curriculum focuses on 25 firesafety behaviors deemed necessary to fulfill the basic goals of:

Protection of the individual and others from fire;
Protection of fire; and
Persuasion or motivation of individuals to practic firesafety.

Each behavioral objective is organized in such a way as to involve:

the action components including skills and practices;
the cognitive aspects involving knowledge and understanding;
the affective components consisting of attitudes, beliefs, and values.

The 25 key firesafety behaviors are integrated into regular subject areas of the classroom. There is a card for each behavior that suggests participatory, affirming activities within the subjects normally taught at that grade level such as mathematics, science, language arts, etc. Although the same 25 behaviors are taught year after year, they increase in complexity as the child matures. To assist teachers, there are three levels of instruction outlined. Level I applies to kindergarten-grade 2; Level II to grades 3-5; Level III to grades 6-8. The notebook for each level contains lesson plans, illustrations, firesafety background information, evaluation instruments, and an extensive reference guide to supplementary materials.

LNTB Network

A network of regional field representatives was organized in 1982 to assist in the implementation of the Learn Not to Burn Curriculum throughout the United States. These representatives work within specific geographic regions to provide technical assistance to users and potential users of the program. They also conduct informational workshops for the fire service, educators, and community leaders, as well as in-service training for teachers using the program.

All regional representatives have extensive backgrounds in fire and burn safety and are among the leading advocates of promoting education as a means to a more firesafe environment. Listed below are the Regional Representatives.

REGION 1 (Nevada, California, Hawaii)
Jan Gratton
469 S. Albertson Ave.
Covina, CA 91723
(213) 331-8792

REGION 2 (Alaska, Montana, Idaho, Oregon, Washington)
Ron Mehlert
14116 65th Drive, W.
Edmonds, WA 98020
(206) 743-1748

REGION 3 (Kansas, Nebraska, Oklahoma, Colorado, Utah, Wyoming)
Hugh Graham
Fire Service Training
Fire Building
Oklahoma State University
Stillwater, OK 74078
(405) 624-5727
(405) 889-7146

REGION 4 (Texas, Arizona, New Mexico)
Carol Gross
Phoenix Fire Dept.
620 W Washington St.
Phoenix, AZ 85003
(602) 262-6002

REGION 5 (North Carolina, South Carolina, Georgia, Florida, Alabama, Louisiana, Arkansas, Tennessee, Mississippi)
Cathy Lohr
Fire & Rescue Services Div.
Dept. of Insurance
Box 26387
Raleigh, NC 27611
(919) 733-2142

REGION 6 (Michigan, Wisconsin, Minnesota, South Dakota, North Dakota, Iowa)
Craig Herling
Madison Fire Dept.
325 W. Johnson St.
Madison, WI 53703
(608) 266-4420

REGION 7 (Kentucky, Ohio, Indiana, Illinois, Missouri)
Pat Mieszala
Burn Concerns
4218 N. Pulaski Rd.
Chicago, IL 60641
(312) 283-4112

REGION 8 (Maryland, Virginia, West Virginia, Pennsylvania, Delaware)
Edi Maletsky
Educational Coordinator
879 Tryens Rd.
Aston, PA 19014
(215) 459-2255

REGION 9 (Connecticut, New Jersey, New York)
Bill Porter
William Porter Associates
551 Litchfield Turnpike
Bethany, CT 06525
(203) 393-3706

REGION 10 (Massachusetts, Rhode Island, New Hampshire, Maine, Vermont)
Teresa Smalley
7 Jackson Rd.
Scituate, MA 02066
(617) 545-1664

NFPA International Activities

NFPA is truly an international organization with members in more than 85 countries around the world. As with U.S. membership, overseas members include a broad spectrum of individuals and organizations concerned with firesafety.

The demand for NFPA services throughout the world has been increasing at a rapid pace. NFPA is especially active in developing countries who recognize the value of NFPA's respected codes and standards in order to enhance firesafety in their rapidly growing cities. NFPA's codes and standards provide an internationally accepted basis for integrating the wide variety of designers, contractors and suppliers that is so frequent in these new projects.

NFPA training programs are also in great demand throughout the world. Recent technical seminars conducted by NFPA have included Arson and Fire Investigation in Hong Kong, Life Safety Code in Japan, Industrial Fire Safety in Taiwan, Colombia, and Abu Dhabi.

NFPA also provides a long-term training program for the fire service of the State of Kuwait. The objective of this program is to train fire officer cadets to the standard of NFPA 1001 and 1021. The first class of 10 officers completed their two-year program in 1983 and now are on duty with the Kuwait Fire Department. An additional 43 cadets are currently in training. In addition, NFPA has a full-time training advisor located in Kuwait.

NFPA's international operations are located in the Washington, D.C. office which handles the daily stream of requests for assistance. Additional information can be obtained by contacting:

NFPA International Operations
Suite 220
600 Maryland Avenue, S.W.
Washington, D.C. 20024
Tel: (202) 484-8200

Hazardous Materials

Hazardous Materials Definitions

Department of Transportation Definitions

Hazardous materials are regulated by the U.S. Department of Transportation (DOT). DOT specifically identifies the hazardous materials and publishes regulations that deal with their transportation, placarding, handling, and with recommended emergency response procedures. The regulations include specifications for tank construction. The DOT categorizes hazardous materials into the same classifications used by the United Nations Committee of Experts on the Transport of Dangerous Goods. These classifications are as follows: (See Title 49 of the Code of Federal Regulations for complete definitions.)

Explosive: Any chemical compound, mixture, or device, the primary or common purpose of which is to function by explosion, i.e., with substantially instantaneous release of gas and heat.

Compressed Gas: Any material or mixture having in the container an absolute pressure exceeding 40 psi at 70°F or, regardless of the pressure at 70°F, having an absolute pressure exceeding 104 psi at 130°F, or any liquid flammable material having a vapor pressure exceeding 40 psi absolute at 100°F as determined by ASTM Test O-323.

Flammable Liquid: Any liquid having a flash point below 100°F.

Flammable Solid: Any solid material, other than one classed as an explosive, which, under conditions normally incident to transportation is liable to cause fires through friction, retained heat from manufacturing or processing, or which can be ignited readily and when ignited burns so vigorously and persistently as to create a serious transportation hazard. Included in this class are spontaneously combustible and water-reactive materials.

Oxidizer: A substance such as a chlorate, permanganate, inorganic peroxide, or a nitrate, that yields oxygen readily to stimulate the combustion of organic matter.

Poisons: These are divided into three groups, A, B, and Irritating Material, according to the degree of hazard in transportation. Class A poisons are such that a very small amount mixed with air is dangerous to life; Class B are those known to be so toxic to men as to afford a hazard to health during transportation. Irritating Materials are those substances which, upon contact with fire or when exposed to air, give off dangerous or intensely irritating fumes, but not including any poisonous material Class A.

Corrosives: Substances that cause visible destruction or irreversible alterations in human skin tissue at the site of contact, or in the case of leakage from its packaging, a liquid that has a severe corrosion rate on steel.

Radioactive Materials: See 173.389 of Title 49 for the extensive list of definitions of radioactive materials.

Miscellaneous: These include Other Regulated Material (ORM) specified in Subpart J of Title 49 of the Code of Federal Regulations.

Environmental Protection Agency Definitions

Hazardous Wastes: These are regulated by the United States Environmental Protection Agency (EPA), as a direct result of the 1976 Resource Conservation and Recovery Act (RCRA). The EPA was directed to issue regulations governing hazardous wastes, including their packaging, labeling, and transportation. In addition to transportation, EPA covers generation and disposal, or what is commonly referred to as the "cradle-to-grave" handling of wastes. It is important to note that the Agency has application on both an intrastate and an interstate basis. EPA classifies hazardous wastes according to four characteristics, as follows:

1. *ignitibility*: liquids that have a flash point of less than 140°F; non-liquids likely to cause fires through friction, moisture absorption, spontaneous heating, etc.; ignitible compressed gases; and oxidizers.
2. *corrosivity*: wastes exhibiting a pH of 3 or less and of 12 or more, or wastes that corrode steel at a rate greater than 0.25 inches per year.
3. *reactivity*: wastes that undergo violent chemical change, form explosive mixtures with water, generate toxic fumes when mixed with water, explode when subjected to a strong initiating force, or explode at normal temperatures and pressures.
4. *toxicity*: wastes that cause the contamination of ground water through the leakage of contaminants when land-disposed.

Hazardous Substances

As a group, hazardous substances derives its origins from the 1976 Clean Water Act Amendments that direct the EPA to regulate "oil and hazardous substances." The EPA has a specific list of 299 hazardous substances by name. If a navigable waterway is affected by a spill from any of the listed substances, the person responsible for the spill must cover cleanup costs to a maximum of $50 million per incident.

Hazardous Materials Identification Systems

Department of Transportation Placard and Labeling System

Many people are involved in controlling the transportation and use of hazardous materials. The Transportation Safety Act of 1974, which became effective in 1975, gave new stimulus to hazardous materials regulations although federal regulations had existed for years before this act. The Department of Transportation (DOT) is responsible for regulating the transportation of hazardous materials by air, water, highway, rail, and pipelines. DOT regulations [see *Title 49, Code of Federal Regulations (49 CFR)*] cover every phase of a shipment, including determining which materials may or may not be carried. *Title 49* also contains requirements for training personnel. Regulations hold the manufacturer, shipper, and carrier responsible for training any involved persons in the proper preparation of the materials for transport and for strict adherence to the regulations.

Regulations govern the packaging of hazardous materials for shipment. DOT maintains strict container specifications for transporting hazardous materials. For example, certain materials may only be shipped in hermetically-sealed drums that are manufactured according to DOT standards. These standards include material strength, thickness, fabrication, and container capacity. DOT stipulates that after the hazardous material has been packaged, the individual containers must be labeled. Bulk freight containers or vehicles must be placarded. The regulations specify a standard labeling and placarding system that warns of the presence of hazardous materials.

DOT requires that shipping documents indicate the quantity being shipped, the proper DOT shipping name for the material, the identification number, and the hazard class. Carriers are also required to notify the Department of Transportation by telephone and submit a written report of incidents involving death, injury, or large property loss to the agency. A written report must be made on any unintentional release (a spill, accident, or leakage) of product.

DOT hazardous materials regulations apply primarily to international and interstate transportation (transportation across state borders). They do not apply to intrastate carriers (transportation within one state) unless the carrier also engages in interstate transportation. However, most states have adopted these federal regulations (49 CFR) in whole or in part for intrastate carriers. To find out what regulations apply to transportation of hazardous materials within your state, check with the state and local agencies that have authority.

DOT Placard Requirements

Effective November 1, 1981, new DOT regulations require that each tank truck vehicle must display a designated four-digit number. The identification numbering system is based primarily on the system adopted for worldwide use by the United Nations Committee of Experts on the Transport of Dangerous Goods.

The numbers are assigned by governmental authorities under the aegis of the Economic and Social Council of the United Nations, and each number has the same meaning throughout worldwide commerce. Each four-digit number identifies a specific hazardous material, and each has no other meaning or use. For example, 1294 will always signify Toluene (Toluol).

As an adjunct to the identification system, a manual has been prepared to associate the identification number with a brief instruction that is intended to assist emergency personnel during the first minutes of a hazardous materials accident. This manual is called the *Emergency Action Guide* and is supplied to all emergency response vehicles.

Tank trucks carrying hazardous materials must have the Hazardous Identification (HI) number on all four sides. It can be applied in two ways: an identification number label in addition to the existing placard, with the orange colored label having a black border and black 4-in. high numbers; or the number can be displayed in the existing placard already required by DOT.

However, a tank vehicle transporting gasoline or fuel oil has a third option because special placarding rules have been established for these products. In order to eliminate the need for changing the numbered placards each time the product carried changes, a single placard may be used with the HI number associated with the lowest flash point of any distillate fuel ever carried in the tank.

In addition, placards with the words "gasoline" or "fuel oil" on the diamond-shaped placard in place of the HI number are also authorized. If a tank contains only gasoline or fuel oil and has the words "gasoline" or "fuel oil" on each side and rear in 2-in. letters, or uses placards having the words "gasoline" or "fuel oil" in place of the HI number, the HI number will not be required.

DOT Label Requirements

DOT hazardous materials regulations require diamond-shaped labels on shipping containers holding an amount of hazardous material which could cause a hazardous condition in transportation. These color-coded labels bear a hazard symbol, or pictograph, and the name of the hazard. They carry no warning text. Regulations generally permit only a single label on a multi-hazard exposure, that label showing the most dangerous hazard present. Where a material is extremely toxic, explosive, or highly radioactive, the proper label must be used in addition to any other hazard label. In addition the package must be marked with the name of contents as it appears on a Commodity List in DOT regulations. This may be a chemical name or a class name such as "Corrosive Liquid N.O.S.," so is of secondary usefulness. On compressed gas cylinders, the label may be attached to a wire-tied tag.

Presence of a DOT label on a package or container indicates a dangerous hazard. Because of exemptions, based mostly on the size of inner containers placed in an outside shipping container, a package without a DOT label may contain significant amounts of fairly dangerous materials, including flammable liquids.

A chart showing the DOT placards and labels is available from DOT by writing: U.S. Department of Transportation, Research and Special Programs Administration, Materials Transportation Bureau, Office of Operations and Enforcement, Washington, DC 20590.

United Nations System (IMCO Code)

International shipments of hazardous materials are subject to requirements of the IMCO code (Intergovernmental Maritime Consultative Organization). The IMCO Code contains both hazard class and division designations for materials. The names IMCO and UN are used interchangeably when referring to these classes and divisions.

The difference between the IMCO (UN) system and the DOT hazard class system are the designations given to the different hazard classes. Instead of a name such as flammable liquid for a class of materials, IMCO (UN) assigns a class and a division number. UN class and division numbers may be displayed at the bottom of placards.

The following is a listing of IMCO (UN) classes and divisions, including basic definitions. Corresponding DOT classes are included within the parentheses.

Class 1 - Explosives

Division 1.1—Substances and articles that have a mass explosion hazard. (Explosive A)

Division 1.2—Substances and articles that have a projection hazard but not a mass explosion hazard. (Explosive A or B)

Division 1.3—Substances and articles that have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not mass explosion hazard. (Explosive B)

Division 1.4—Substances and articles that present no significant hazard. (Explosive C)

Division 1.5—Very insensitive substances. (Blasting Agent)

Class 2 - Gases (compressed, liquefied or dissolved under pressure)

Division 2.1—Flammable gases. (Flammable gas)

Division 2.2—Nonflammable gases. (Nonflammable gas)

Division 2.3—Poison gases. (Poison A)

Class 3 - Flammable liquids

Division 3.1—Low flash point group (liquids with flash points below 0°F). (Flammable liquid)

Division 3.2—Intermediate flash point group (liquids with flash points of 0°F or above but less than 73°F). (Flammable liquid)

Division 3.3—High flash point group (liquids with flash points of 73°F or above up to and including 141°F). (Flammable liquid or Combustible liquid)

Class 4 - Flammable solids or substances

Division 4.1—Flammable solids. (Flammable solid)

Division 4.2—Substances liable to spontaneous combustion. (Flammable solid or, for pyroforic liquids, Flammable liquid)

Division 4.3—Substances emitting flammable gases when wet. (Flammable solid)

Class 5 - Oxidizing substances

Division 5.1—Oxidizing substances or agents. (Oxidizer)

Division 5.2—Organic peroxides. (Organic peroxide)

Class 6 - Poisonous and infectious substances

Division 6.1—Poisonous substances. (Poison B)

Division 6.2—Infectious substances. (Etiologic agent)

Class 7 - Radioactive substances. (Radioactive material)

Class 8 - Corrosives. (Corrosive material)

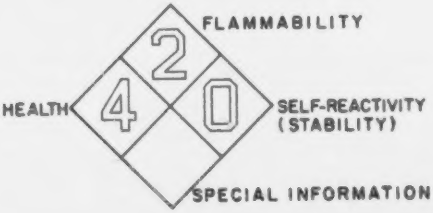
Class 9 - Miscellaneous dangerous substances. (Other regulated material)

The NFPA 704 System of Hazard Identification

NFPA 704, Identification of the Hazards of Materials, is a symbol system intended for use on fixed installations, such as chemical processing equipment, storage and warehousing rooms, and laboratory entrances. It tells a fire fighter what he must do to protect himself from injury while fighting a fire in the area.

The NFPA 704 Diamond

The information system is based on the "704 diamond" (see illustration) which is the vehicle for visually presenting information on health, flammability, and self-reactivity hazards, as well as special information associated with the hazards.



Numbers from 0 through 4 are placed in the three upper squares of the diamond to show the degree of hazard present for each of the three hazards. The 0 indicates the lowest degree of hazard; the 4, the highest. The fourth square, at the bottom, is used for special information. Three symbols for this latter space are suggested. They are:

1. A letter W with a bar through it (W) to indicate that a material may have a hazardous reaction with water. This does not mean "do not use water," since some forms of water — fog or fine spray — may be used in many cases. What it does say is: "Water may cause a hazard, so use it very cautiously until you have proper information."
2. The letters "ox" to identify materials that possess oxidizing properties.
3. The "radioactive pinwheel" for radioactive materials.

The NFPA 704 diamond symbol is intended to provide immediacy at some sacrifice of adequacy, and there is a tendency to read more into it than it says. The five degrees of hazard, in the order of their descendency, have these general meanings to fire fighters:

4—Too dangerous to approach with standard fire fighting equipment and procedures. Withdraw and obtain expert advice on how to handle.

3—Fire can be fought using methods intended for extremely hazardous situations, such as unmanned monitors or personal protective equipment which prevents all bodily contact.

2—Can be fought with standard procedures, but hazards are present which require certain equipment or procedures to handle safely.

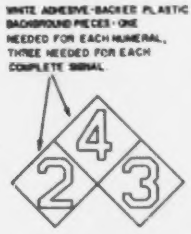
1—Nuisance hazards present which require some care, but standard fire fighting procedures can be used.

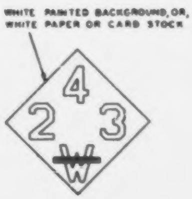
0—No special hazards, therefore no special measures.

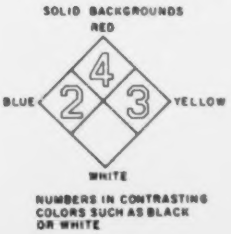
NFPA 704 describes in detail the hazards and hazard levels which the various numbers indicate for the three hazards.

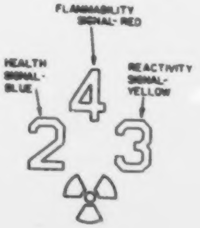
Methods of Presentation

Considerable leeway is allowed in the presentation of the numbers. The only basic requirement is that numbers be spaced as though they were in the diamond outline. Several methods which have been used are shown here. Chapter 5 of the Standard gives recommended layout and sizes for the symbol, and a distance-legibility table, as well as several examples of using the symbol.


WHITE ADHESIVE-BACKED PLASTIC BACKGROUND PIECES - ONE NEEDED FOR EACH NUMERAL, THREE NEEDED FOR EACH COMPLETE SIGNAL.
4
2
3


WHITE PAINTED BACKGROUND, OR, WHITE PAPER OR CARD STOCK
4
2
3
W


SOLID BACKGROUNDS
RED
BLUE
YELLOW
WHITE
4
2
3
NUMBERS IN CONTRASTING COLORS SUCH AS BLACK OR WHITE


FLAMMABILITY SIGNAL - RED
HEALTH SIGNAL - BLUE
REACTIVITY SIGNAL - YELLOW
4
2
3

Numbers (degrees of hazard) for use in the diamond are assigned on the basis of the worst hazard expected in the area, whether it be from hazards of the original material or of its combustion or breakdown products. The effects of local conditions must be considered. For instance, a drum of carbon tetrachloride sitting in a well-ventilated storage shed presents a different hazard from a drum sitting in an unventilated basement.

Advantages of the NFPA 704 System

The NFPA 704 System can warn against hazards under fire conditions of materials which other information systems class as nonhazardous. For example, edible tallow produces toxic and irritating combustion products. It would be given a "2" degree of health hazard, indicating the need for air-supplied respiratory equipment.

NFPA 704 also can warn against overall fire hazards in an area. On the door of a laboratory or storage room, it can warn of the worst hazards likely in a fire situation. Such information is useful both in preplanning and in actual fires.

NFPA 704 can be used without a supplementary manual. Because of its simplicity, the general meanings of the numbers can be memorized easily and the whole symbol read and interpreted quickly on the spot and in poor light.

Disadvantages of the NFPA 704 System

The NFPA 704 system makes no provision for oxygen donor-type oxidizers. It gives only minimum information on the hazards themselves. Since the system informs on protective measures, the same number may be used for different types of hazards so that, for instance, a Health Hazard "3" means "No contact" without saying whether the hazard is corrosive to the skin or toxicity by absorption through the skin. Thus, the symbol is most useful only to trained or informed persons.

Directory of Help for Planning for Hazardous Materials Emergencies

TRAINING PROGRAMS

Agency	Contact	Square Miles	Population
ALABAMA Birmingham Fire and Rescue Service 1808 Seventh Avenue, North Birmingham, AL 35235 (205) 323-8304	O.N. Gallant Fire Chief	100	275,000
ARIZONA Phoenix Fire Department Room 465 620 West Washington Street Phoenix, AZ 85503 (602) 262-6297	Gary P. Morris Captain	350	800,000
Tucson Fire Department P.O. Box 27210 Tucson, AZ 85720 (602) 791-4502	David H. Canterbury Captain	112	400,000
ARKANSAS Pine Bluff Fire Department Civic Center 200 East Eighth Street Pine Bluff, AR 71601 (501) 534-0011	Ray Jacks Fire Chief	17	57,380
CALIFORNIA Los Angeles Fire Department 200 North Main Street Los Angeles, CA 90012 (213) 485-6100	James Young Battalion Chief	467.63	3,000,000

Agency	Contact	Square Miles	Population
Merced Fire Department P.O. Box 2068 Merced, CA 95344 (209) 722-8331	Kenneth W. Mitten Fire Chief	16	39,800
Sacramento Fire Department Room 3 915 I Street Sacramento, CA 95814 (916) 449-5266	Jan Dunbar Captain	94	295,000
San Clemente Fire Department 100 Avenida Presidio San Clemente, CA 92672 (714) 492-5105	Ronny Coleman Fire Chief	15	27,000
San Francisco Fire Department 260 Golden Gate Avenue San Francisco, CA 94102 (415) 861-8000	Jerry Grey Captain	49	690,000 night 1,250,000 day
COLORADO Aurora Fire Department 1470 South Havana Street Aurora, CO 80012 (303) 695-7116	Fay B. Sweat Training Chief	65	175,000
Barcroft Fire Protection District 3301 South Field Street Lakewood, CO 80227 (303) 989-4307	Bob Porter Assistant Chief	80	155,000
Boulder Fire Department P.O. Box 791 Boulder, CO 80306 (303) 441-3351	Larry Stern Assistant Chief	20	80,000
Castlewood Fire Protection District 7281 East Day Creek Road Englewood, CO 80012 (303) 770-3720	Bob May Training Officer	40	40,000 night 100,000 day
Denver Fire Department 745 West Colfax Avenue Denver, CO 80204 (303) 575-5522	John Marshall Lieutenant, Bureau of Fire Prevention	117	485,000
Lakewood Fire Department 1545 Robb Street Lakewood, CO 80215 (303) 237-9588	Tom Dellinger Assistant Chief	30	110,000
Littleton Fire Department 2255 West Berry Avenue Littleton, CO 80165 (303) 795-3800	Phillip Kessler Training Officer	45	107,000

Agency	Contact	Square Miles	Population
CONNECTICUT Hartford Fire Department 275 Pearl Street Hartford, CT 06103 (203) 525-3123	Raymond McTeague Deputy Fire Chief	18.9	150,000
Thompsonville Fire Department Pearl Street Station Enfield, CT 06802 (203) 745-3365	Paul E. Censki Fire Marshall	12	12,000
West Haven Fire Department 336 Elm Street West Haven, CT 06516 (203) 932-2228	William S. Johnson Fire Chief	10.4	53,000
DELAWARE Wilmington Fire Department 112 East Twelfth Street Wilmington, DE 19801 (302) 571-4410	Jerome Donohue Fire Chief	15.77	95,000
FLORIDA Jacksonville Fire Division 107 Market Street Jacksonville, FL 32202 (904) 633-5433	Ron G. Gore Captain	844	600,000
ILLINOIS Des Plaines Fire Department 405 South River Road Des Plaines, IL 60016 (312) 391-5333	David Clark Deputy Chief, Training	17	57,000
INDIANA Indianapolis Fire Department Training Academy 901 N. Post Road Indianapolis, IN 46219	Captain Ronald Callahan Director of Training	85	750,000
KANSAS Wichita Fire Department City Hall, Twelfth Floor 455 North Main Street Wichita, KS 67207 (316) 268-4451	Jim Sparr Fire Chief	110	285,000
LOUISIANA New Orleans Fire Department 317 Decatur Street New Orleans, LA 70130 (503) 581-6200	John L. Riviere Training Chief	199	565,000
MARYLAND Montgomery County Fire and Rescue Services 101 Monroe Street Rockville, MD 20852 (301) 251-2443	Warren E. Isman Fire Chief	506	600,000

Agency	Contact	Square Miles	Population
MASSACHUSETTS			
Boston Fire Department 115 South Hampton Street Boston, MA 02118 (617) 442-8000	Walter Cameron Deputy Chief	47	600,000
Plymouth Fire Department 114 Sandwich Street Plymouth, MA 02360 (617) 746-2212	Arthur H. Lamb Fire Chief	109	38,000
Springfield Fire Department 605 Worthington Street Springfield, MA 01105 (413) 787-6400	Norris Quinn District Chief, Training	32	160,000
MINNESOTA			
Minneapolis Fire Department City Hall, Room 230 Minneapolis, MN 55415 (612) 348-2890	Emmett M. Kaufmann Assistant Chief of Training	58	370,091
MISSISSIPPI			
Pass Christian Fire Department 110 West Second Street Pass Christian, MS 39574 (601) 452-9715	George M. Mixon Fire Chief	6	5,000
MISSOURI			
Fort Osage Fire Protection District 319 South Central Buckner, MO 64016 (816) 249-3636	Richard Lehmann Fire Chief	110	9,800
Springfield Fire Department 235 North Kimbrough Avenue Springfield, MO 65804 (417) 864-1046	Gene Nichols Chief, Fire Operations and Training	78	170,000
NEBRASKA			
Grand Island Fire Department 302 South Pine Street Grand Island, NE 68801 (308) 381-5300	George Arnett Fire Chief	18.5	34,000
NEVADA			
Las Vegas Fire Department 400 East Stewart Avenue Las Vegas, NV 89101 (702) 386-6376	Rex Shelburne Captain, Paramedic Coordinator	59	168,000
NORTH CAROLINA			
Durham Fire Department 2008 East Club Boulevard Durham, NC 27707 (919) 683-4242	George King Captain, Training Division	40	105,000

Agency	Contact	Square Miles	Population
OHIO			
Cincinnati Fire Department 430 Central Avenue Cincinnati, OH 45202 (513) 352-2315	Robert G. Rathman Assistant Chief	78	385,000
OREGON			
Multnomah County Fire District 10 (Interagency) P.O. Box 16368 Portland, OR 97216 (503) 760-1081	Len Malmquist Assistant Fire Marshal	75.2	380,000
Ontario Fire Department and Rural Fire District 7-302 444 S.W. Fourth Street Ontario, OR 97914 (503) 889-7687	Larry Roberts Fire Chief	59	18,000
Portland Fire Bureau 55 S.W. Ash Street Portland, OR 97204 (503) 248-4375	Bill Hebert Chief Training Officer	108	380,000
PENNSYLVANIA			
Philadelphia Fire Department Third and Spring Garden Streets Philadelphia, PA 19123 (215) 686-4700	Joseph R. Rizzo Fire Commissioner	129	1,688,210
RHODE ISLAND			
Narragansett Fire Department 40 Caswell Street Narragansett, RI 02882 (401) 789-1000	Otis C. Wyatt, Jr. Fire Chief	14	12,000
TEXAS			
Dallas Fire Department 1500 Marilla Street Dallas, TX 75201 (214) 670-4565	S. Joseph O'Briant Deputy Chief	378	904,000
Houston Fire Department 410 Bagby Street Houston, TX 77002 (713) 222-3964	M.H. McRae District Chief	556	1,500,000
VIRGINIA			
Chesterfield County Fire Department P.O. Box 40 Chesterfield, VA 23832 (804) 748-1360	David E. Barfield Battalion Chief Training Officer	446	152,000
Newport News Fire Department 12455 Warwick Blvd. Newport News, VA 23607	Jack Walls Chief	—	—

Agency	Contact	Square Miles	Population
Virginia Beach Fire Department Public Safety Building Virginia Beach, VA 23456 (804) 426-6272	Frank Bennett District Chief	310	272,000
WASHINGTON			
Wenatchee Fire Department 136 South Chelan Wenatchee, WA 98801 (509) 662-6125 (pesticides)	Mike Brown Fire Chief	5	20,000
WYOMING			
Wyoming Disaster & Civil Defense 5500 Bishop Blvd. Cheyenne, WY 82009 (307) 777-7566	Brooke Hefner State Hazardous Material Coordinator	97,911 (entire state)	468,909

RESPONSE TEAMS

Agency	Contact	Square Miles	Population
ARIZONA			
Mesa Fire Department 13 West First Street Mesa, AZ 85201 (602) 834-2101	Douglas Ellis Training Captain	68	170,000
Phoenix Fire Department Room 465 620 West Washington Street Phoenix, AZ 85503 (602) 262-6297	Gary P. Morris Captain	350	800,000
Tucson Fire Department P.O. Box 27210 Tucson, AZ 85720 (602) 791-4502 (602) 791-4434 Dispatch 24 Hour	David H. Canterbury Captain	10,000 (multijurisdictional)	500,000
CALIFORNIA			
Los Angeles Fire Department 200 North Main Street Los Angeles, CA 90012 (213) 485-6100	James Young Battalion Chief	467.3	3,000,000
Los Angeles County Fire Department 1320 North Eastern Avenue Los Angeles, CA 90063 (213) 267-2485	Stephen Sherrill Battalion Chief	2,190	2,500,000
Sacramento Fire Department Room 3 915 I Street Sacramento, CA 95814 (916) 449-5266	Jan Dunbar Captain	94	295,000

Agency	Contact	Square Miles	Population
San Francisco Fire Department 260 Golden Gate Avenue San Fransisco, CA 94102 (415) 861-8000	Jerry Grey Captain	49	690,000 night 1,250,000 day
San Jose Fire Department 476 Park Avenue San Jose, CA 95112 (408) 277-4251	Mike Jonasonn Captain	210	637,000
COLORADO			
Aurora Fire Department 1470 South Havana Street Aurora, CO 80012 (303) 695-7116	Fay B. Sweat Training Chief	65	175,000
Barcroft Fire Protection District 3301 South Field Street Lakewood, CO 80227 (303) 989-4307	Bob Porter Assistant Chief	80	155,000
Colorado Springs Fire Department 31 South Weber Street Colorado Springs, CO 80903 (303) 471-6820	Richard Smith Chief	103	215,000
Denver Fire Department 745 West Colfax Avenue Denver, CO 80204 (303) 575-5522	John Marshall Lieutenant, Bureau of Fire Prevention	117	485,000
FLORIDA			
Jacksonville Fire Division 107 Market Street Jacksonville, FL 32202 (904) 633-5433	Ron G. Gore Captain	844	600,000
Metro-Dade County Fire Department 6000 S.W. 87th Avenue Miami, FL 33173 (305) 596-8600	Charles E. Sowers Division Chief, EMS	895	1,000,000
Miami Fire Department P.O. Box 330708 Miami, FL 33133 (305) 579-6300	E.J. Bratz Captain	34	365,000
ILLINOIS			
Springfield Fire Department 201 North Seventh Street Springfield, IL 62701 (217) 788-8467	Clifford Garst Deputy Chief, Special Services	90	140,000

Agency	Contact	Square Miles	Population
KANSAS Wichita Fire Department City Hall, Twelfth Floor 455 North Main Street Wichita, KS 67207 (316) 268-4451	Jim Sparr Fire Chief	1,008 (multijurisdictional)	360,000
KENTUCKY Louisville Fire Division 1135 West Jefferson Street Louisville, KY 40203 (502) 587-3701	George J. Herbert Assistant Chief of Suppression	702	270,000
MARYLAND Anne Arundel County Fire Department P.O. Box 276 Millersville, MD 21108 (301) 987-4010	Burton Phelps Deputy Chief	324	400,000
Baltimore City Fire Department 410 East Lexington Street Baltimore, MD 21202 (301) 396-5683	Donald Webb Captain, Training Officer	92	860,000
Montgomery County Fire and Rescue Services 101 Monroe Street Rockville, MD 20852 (301) 251-2443	Warren E. Isman Fire Chief	506	600,000
MASSACHUSETTS Nantucket Fire Department (petrochemical spill) Lower Pleasant Street Nantucket, MA 02554 (617) 228-2324	Robert B. Farley EMT/FF	50	6,500 winter 40,000 summer
Pembroke Fire Department Fire Headquarters Center Street Pembroke, MA 02359 (617) 293-2300	Robert Silva Fire Investigator	23	13,000
MISSOURI Kansas City Fire Department City Hall, 22nd Floor 414 East Twelfth Street Kansas City, MO 64106 (816) 531-2121	John Hamilton Deputy Chief, Administration	316.5	475,000
Lee's Summit Fire Department 207 South Douglas Street Lee's Summit, MO 64063 (816) 251-2345	Mike Wren Acting Fire Chief	74	30,000

Agency	Contact	Square Miles	Population
NEBRASKA			
David City Volunteer Fire Department P.O. Box 254 David City, NE 68632 (402) 367-3530	Bill Ortmeir Fire Chief	55	5,100
Lincoln Fire Department 1801 Q Street Lincoln, NE 68508 (402) 473-6363	Mike Merwick Fire Chief	55	176,000
NEVADA			
Carson City Fire Department (Interagency) 111 North Curry Street Carson City, NV 89701 (702) 887-2200	Bernie Sease Fire Chief	146	33,000
Las Vegas Fire Department 400 East Stewart Avenue Las Vegas, NV 89101 (702) 386-6376	Rex Shelburne Captain, Paramedic Coordinator	59	168,000
NEW YORK			
New York Fire Department 270 Livingston Street Brooklyn, NY 11201 212-403-1555 or 1556	John O'Rourke Hazardous Materials Coordinator	320	7,149,300
OREGON			
Multnomah County Fire District 10 (multi-jurisdictional) P.O. Box 16368 Portland, OR 97216 (503) 760-1081	Len Malmquist Assistant Fire Marshal	75.2	380,000
PENNSYLVANIA			
North Hempfield Volunteer Fire Company RD 3, Box 400 Greensburg, PA 15601 (412) 834-9832	Jack W. Simon Fire Chief	1,040 (multijurisdictional)	395,000
Philadelphia Fire Department Third & Spring Garden Streets Philadelphia, PA 19123 (215) 686-4700	Joseph R. Rizzo Fire Commissioner	129	1,688,210
TEXAS			
Houston Fire Department 410 Bagby Street Houston, TX 77002 (713) 222-3964	M. H. McRae District Chief	556	1,500,000
WASHINGTON			
Bellingham Fire Department 210 Lottie Street Bellingham, WA 98225 (206) 676-6813	Michael Leigh Assistant Chief	25	46,000

Agency	Contact	Square Miles	Population
Seattle Fire Department 301 Second Avenue, South Seattle, WA 98104 (206) 625-4091	Rod Bower Deputy Chief	97.5	500,000
WISCONSIN			
Madison Fire Department 325 West Johnson Street Madison, WI 53704 (608) 266-4420	Edward D. Durkin Fire Chief	52	170,000
Milwaukee Fire Department 711 West Wells Street Milwaukee, WI 53209 (414) 276-5656, Ext. 320	Gustave Koleas Deputy Chief	98	635,000
Spokane Fire Department W. 44 Riverside Ave. Spokane, WA 99201 (509) 456-2694	Richard Sweetland Assistant Chief	57	180,000

RESPONSE PLANS

ALABAMA			
Birmingham Fire and Rescue Service 1808 Seventh Avenue, North Birmingham, AL 35235 (205) 323–8304	O. N. Gallant Fire Chief	100	275,000
Center Point Fire Department P.O. Box 9651 Center Point, AL 35215 (205) 853-5098	J. D. Wallace, Jr. Fire Chief	50	68,000
Hoover Fire Department 1581 Patton Chapel Road Hoover, AL 35226 (205) 823-4060	T. E. Bradley Fire Chief	50	23,000
ARIZONA			
Mesa Fire Department 13 West First Street Mesa, AZ 85201 (602) 834-2101	Douglas Ellis Training Captain	68	170,000
Phoenix Fire Department Room 465 620 West Washington Street Phoenix, AZ 85503 (602) 262-6297	Gary P. Morris Captain	350	800,000
Tucson Fire Department P.O. Box 27210 Tucson, AZ 85720 (602) 791-4502	David H. Canterbury Captain	10,000 (multijurisdictional)	500,000

Agency	Contact	Square Miles	Population
ARKANSAS			
Pine Bluff Fire Department Civic Center 200 East Eighth Street Pine Bluff, AR 71601 (501) 534-0011	Ra[illegible]acks Fire Chief	17	57,380
CALIFORNIA			
Los Angeles Fire Department 200 North Main Street Los Angeles, CA 90012 (213) 485-6100	James Young Battalion Chief	467.63	3,000,000
Sacramento Fire Department Room 3 915 I Street Sacramento, CA 95814 (916) 449-5266	Jan Dunbar Captain	94	295,000
San Clemente Fire Department 100 Avenida Presidio San Clemente, CA 92672 (714) 492-5105	Ronny Coleman Fire Chief	786 (multijurisdictional)	1,900,000
San Francisco Fire Department 260 Golden Gate Avenue San Francisco, CA 94102 (415) 861-8000	Jerry Grey Captain	49	690,000 night 1,250,000 day
Santa Rosa Fire Department 955 Sonoma Avenue Santa Rosa, CA 95404 (707) 528-5311	Gordon Stedman Training Director	27	82,000
COLORADO			
Barcroft Fire Protection District 3301 South Field Street Lakewood, CO 80227 (303) 989-4307	Bob Porter Assistant Chief	80	155,000
Boulder Fire Department P.. Box 791 Boulder, CO 80306 (303) 441-3351	Larry Stern Assistant Chief	20	80,000
Denver Fire Department 745 West Colfax Street Denver, CO 80204 (303) 575-5522	John Marshall Lieutenant, Bureau of Fire Prevention	117	485,000
Littleton Fire Department 2255 West Berry Avenue Littleton, CO 80165 (303) 795-3800	Phillip Kessler Training Officer	45	107,000

Agency	Contact	Square Miles	Population
CONNECTICUT			
Branford Fire Department 45 North Main Street Branford, CT 06405 (203) 488-7266	Peter Mullen Deputy Chief	27.9	29,000
Hartford Fire Department 275 Pearl Street Hartford, CT 06103 (203) 525-3123	Charles A. Gallon Assistant Fire Chief	18.9	150,000
Tolland Fire Department 3 Rhodes Street Tolland, CT 06084 (203) 871-0002	Ronald Litteil Fire Chief	41	11,000
FLORIDA			
Hialeah Fire Department 501 Palm Avenue Hialeah, FL 33011 (305) 883-5840	William Ackerly District Chief, Rescue Coordinator	22	180,000
Jacksonville Fire Department (Interagency) 107 Market Street Jacksonville, FL 32202 (904) 633-5433	Ron G. Gore Captain	844	600,000
Metro-Dade County Fire Department 6000 S.W. 87th Avenue Miami, FL 33173 (305) 596-8600	Charles E. Sowers Division Chief, EMS	895	1,000,000
ILLINOIS			
Des Plaines Fire Department 405 South River Road Des Plaines, IL 60016 (312) 391-5333	David Clark Deputy Chief, Training	17	57,000
KANSAS			
Wichita Fire Department City Hall, Twelfth Floor 455 North Main Street Wichita, KS 67207 (316) 268-4451	Jim Sparr Fire Chief	1,008 (multijurisdictional)	360,000
MARYLAND			
Montgomery County Fire and Rescue Services 101 Monroe Street Rockville, MD 20852 (301) 251-2443	Warren E. Isman Fire Chief	506	600,000
MASSACHUSETTS			
Pembroke Fire Department Fire Headquarters Center Street Pembroke, MA 02359 (617) 293-2300	Robert Silva Fire Investigator	23	13,000

Agency	Contact	Square Miles	Population
Seekonk Fire Department Town Hall 100 Peck Street Seekonk, MA 02771 (617) 336-8510	John E. Shaw Fire Chief	13	12,000
Springfield Fire Department 605 Worthington Street Springfield, MA 01105 (413) 787-6400	Norris Quinn District Chief, Training	32	160,000
MISSISSIPPI Pass Christian Fire Department 110 West Second Street Pass Christian, MS 39574 (601) 452-9715	George M. Mixon Fire Chief	6 900 (multijurisdictional)	5,000 200,000
MISSOURI Lee's Summit Fire Department 207 South Douglas Street Lee's Summit, MO 64063 (816) 251-2345	Mike Wren Acting Fire Chief	74	30,000
Springfield Fire Department 235 North Kimbrough Avenue Springfield, MO 65804 (417) 864-1046	Gene Nichols Chief, Fire Operations and Training	78	170,000
NEBRASKA Grand Island Fire Department 302 South Pine Street Grand Island, NE 68801 (308) 381-5300	George Arnett Fire Chief	18.5	34,000
NEVADA Las Vegas Fire Department 400 East Stewart Avenue Las Vegas, NV 89101 (702) 386-6736	Rex Shelburne Captain, Paramedic Coordinator	59	168,000
NEW JERSEY Hoboken Fire Department 201 Jefferson Street Hoboken, NJ 07030 (201) 420-2259	Ed McDonald Deputy Chief	1	45,000
OKLAHOMA Tulsa Fire Department 411 South Frankfurt Avenue Tulsa, OK 74120 (918) 581-5291	Paul M. Dudley Deputy Chief	196	365,000
OREGON Multonomah County Fire District 10 P.O. Box 16368 Portland, OR 97216 (503) 760-1081	Len Malmquist Assistant Fire Marshall	75.2 (multijurisdictional)	380,000

Agency	Contact	Square Miles	Population
Tualatin Rural Fire Protection District P.O. Box 127 Tualatin, OR 97062 (503) 682-2601	Douglas Krebs Executive Assistant Chief	104	100,000
PENNSYLVANIA			
Philadelphia Fire Department Third and Spring Garden Streets Philadelphia, PA 19123 (215) 686-4700	Joseph R. Rizzo Fire Commissioner	129	1,688,210
RHODE ISLAND			
North Kingstown Fire Department 8150 Post Road North Kingstown, RI 02852 (401) 294-3344	Thomas L. Aylward Fire Chief	44	29,000
TEXAS			
Dallas Fire Department 1500 Marilla Street Dallas, TX 75201 (214) 670-4565	S. Joseph O'Briant Deputy Chief	378	904,000
VIRGINIA			
Fairfax City Fire and Rescue Services 4081 University Drive Fairfax, VA 22030 (703) 385-7874	Joe Bailey Lieutenant, Training Officer	7	22,000
WASHINGTON			
Bellevue Fire Department 666 Bellevue Way, S.W. Bellevue, WA 98004 (206) 455-6892	Bob Hayes Assistant Director, EMS	34	105,000
Bellingham Fire Department 210 Lottie Street Bellingham, WA 98225 (206) 676-6813	Michael Leigh Assistant Chief	25	46,000
Ellensburg Fire Department 102 North Perl Street Ellensburg, WA 98926 (509) 962-9863, Ext. 274	Ed West Fire Chief	5	14,000
Seattle Fire Department 301 Second Avenue, South Seattle, WA 98104 (206) 625-4091	Rod Bower Deputy Chief	97.5	500,000
Spokane Fire Department West 44 Riverside Avenue Spokane, WA 99201 (509) 456-2694	Richard Sweetland Assistant Chief	57	180,000
WYOMING			
Wyoming Disaster & Civil Defense 5500 Bishop Blvd. Cheyenne, WY 82009 (307) 777-7566	Brooke Hefner State Hazardous Material Coordinator	97,914 (entire state)	468,909

TRAINING MANUALS

Agency	Contact	Square Miles	Population
ARIZONA			
Mesa Fire Department 13 West First Street Mesa, AZ 85201 (602) 834-2101	Douglas Ellis Training Captain	68	170,000
Phoenix Fire Department Room 465 620 West Washington Street Phoenix, AZ 85503 (602) 262-6297	Gary P. Morris Captain	350	800,000
Tucson Fire Department P.O. Box 27210 Tucson, AZ 85720 (602) 791-4511	David H. Canterbury Captain	112	400,000
Yuma Fire Department 298 West Fourth Street Yuma, AZ 85364 (602) 782-1831	Jerry L. Chapman Battalion Chief, Training Officer	15	50,000
CALIFORNIA			
Sacramento Fire Department Room 3 915 I Street Sacramento, CA 95814 (916) 449-5266	Jan Dunbar Captain	94	295,000
CONNECTICUT			
Hartford Fire Department 275 Pearl Street Hartford, CT 06103 (203) 525-3123	Raymond McTeague Deputy Fire Chief	18.9	150,000
MASSACHUSETTS			
Pembroke Fire Department Fire Headquarters Center Street Pembroke, MA 02359 (617) 293-2300	Robert Silva Fire Investigator	23	13,000
Springfield Fire Department 605 Worthington Street Springfield, MA 01105 (413) 787-6400	Norris Quinn District Chief, Training	32	160,000
NEVADA			
Las Vegas Fire Department 400 East Stewart Avenue Las Vegas, NV 89101 (702) 386-6376	Rex Shelburne Captain, Paramedic Coordinator	59	168,000
TEXAS			
Dallas Fire Department 1500 Marilla Street Dallas, TX 75201 (214) 670-4565	S. Joseph O'Briant Deputy Chief	378	904,000
WASHINGTON			
Spokane Fire Department West 44 Riverside Avenue Spokane, WA 99201 (509) 456-2694	Richard Sweetland Deputy Chief	57	180,000

EXPERIENCED PERSONS AND ORGANIZATIONS

Contact	Agency	Areas of Expertise
ALABAMA		
Chipley, Alfred S. Director	Division of Solid and Hazardous Waste Alabama Department of Public Health 434 Monroe Street Montgomery, AL 36130 (205) 832-6728	Technical Assistance
Cope, Melvin	P.O. Box 532 Bessemer, AL 35021 (205) 923-7171 (O) (205) 426-1864 (H)	Household Pest Control Pesticide Spray
Hester, Frank Chemical Engineer	Industrial Maintenance Cleaning Contractors, Inc. P.O. Box 569 Bessemer, AL 35021 (205) 428-0621 (O) (205) 428-4084 (H)	Cleaning Chemicals
Oliver, Avery Chairperson	Greater Mobile Industrial Association c/o Shell Chemical Company P.O. Box 525 Axis, AL 36505 (205) 675-2450, Ext. 204	Community Mutual Aid Technical Assistance
Williford, E. John Chief, Monitoring and Surveillance	Alabama Water Improvement Commission Public Health Services Building Montgomery, AL 36130 (205) 277-3630	Response Technical Assistance
ARIZONA		
Burch, Jim Captain	Phoenix Fire Department Room 465 620 West Washington Street Phoenix, AZ 85504 (602) 262-6595	Training Response
Canterbury, David H. Captain, Explosives/Hazardous Materials Section	Tucson Fire Department P.O. Box 27210 Tucson, AZ 85720 (602) 791-4502 (602) 791-4434 Dispatch 24 hours	Training Emergency Response Technical Assistance Multi-jurisdictional response plans
Eberhart, Tony Battalion Chief	Phoenix Fire Department Room 465 620 West Washington Street Phoenix, AZ 85504 (602) 262-6595	Training Response

Contact	Agency	Areas of Expertise
Hermann, Stephen Hazardous Materials Specialist	Arizona Department of Public Safety 2222 W. Encanto Boulevard P.O. Box 6638 Phoenix, AZ 85005 (602) 262-8082	Technical Assistance
Overley, Gail President	Overleys, Inc. 650 West Southern Avenue Mesa, AZ 85202 (602) 962-6638	Transportation and Waste Cleanup
Vaughn, Johnny M. Hazardous Materials Supervisor	Arizona Department of Public Safety 2222 W. Encanto Boulevard P.O. Box 6638 Phoenix, AZ 85005 (602) 262-8082	Technical Assistance
ARKANSAS Combs, George Engineering Manager	Energy Systems Company P.O. Box 1975 El Dorado, AR 71730 (501) 863-7173	Technical Assistance
Wilson, E. Frank Director	Division of Environmental Health Protection Bureau of Environmental Health Services Arkansas Department of Health 4815 West Markham Street Little Rock, AR 72201 (501) 661-2301	Response
CALIFORNIA Coleman, Ronny Fire Chief	San Clemente Fire Department 100 Avenida Presidio San Clemente, CA 92672 (714) 492-5105	Planning Training Response
Dunbar, Jan Captain	Sacramento Fire Department Room 3 915 I Street Sacramento, CA 95814 (916) 449-5266	Training Response Planning
Finocchiaro, Joseph A. Forensic Chemist	Los Angeles Fire Department 200 North Main Street Los Angeles, CA 90012 (213) 485-6100	Training Response
Grey, Jerry Captain	San Francisco Fire Department 260 Golden Gate Avenue San Francisco, CA 94102 (415) 861-8000, Ext. 341	Training Response

Contact	Agency	Areas of Expertise
Meidl, James	Apartment 301 380 Esplanade Pacifica, CA 94044 (415) 359-1592	Technical Assistance
O'Donnell, Jim	South County Industrial Emergency Council c/o South County Fire District 666 Elm Street San Carlos, CA 94070 (415) 578-8011, Ext. 41	Training Regional Coordination
Tompkins, G.A., Ph.D. Hazardous Chemical and Environmental Consultant	EMCON Associates 90 Archer Street San Jose, CA 95112 (408) 275-1444	Technical Assistance
Starr, Dick Coordinator	California Fire Academy 836 Asilomar Boulevard Pacific Grove, CA 93950 (408) 646-4240	Training Programs
Wharton, Richard	Office of State Fire Marshal 7171 Bowling Drive, Suite 600 Sacramento, CA 95823	Training Programs Technical Assistance
Wyngard, Robert L. Chief of Academic Division	California Specialized Training Institute P.O. Box G Camp San Luis Obispo, CA 93406 (805) 544-7100	Training Programs
COLORADO		
DeFreeze, Walt Director	Colorado Training Institute 1001 East 62nd Avenue Denver, CO 80216 (303) 289-4891	Training Programs
Dunn, William S. Chief Chemist	Chemistry Section Colorado Department of Health 4210 East Eleventh Avenue Denver, CO 80220 (303) 320-8333, Ext. 3051	Industrial and Hazardous Waste Technical Assistance and Chemical Analysis
Hazle, Albert J. Director	Radiation Control Division Colorado Department of Health 4210 East Eleventh Avenue Denver, CO 80220 (303) 320-8333, Ext. 6246	Technical Assistance
Heister, Charles Technician, Hazardous Materials Consultant	Training Division Colorado State Patrol 1500 Golden Road Golden, CO 80401 (303) 279-2511	Training Response

Contact	Agency	Areas of Expertise
Marshall, John Lieutenant	Bureau of Fire Prevention Denver Fire Department 745 West Colfax Avenue Denver, CO 80204 (303) 575-5522	Training Response
Martin, William S. Radiological Defense Officer	Division of Disaster Emergency Services Camp George West Golden, CO 80401 (303) 273-1786	Technical Assistance Response Planning
Sutton, Christopher Industrial Hygienist	Colorado Department of Health 4210 East Eleventh Avenue Denver, CO 80220 (303) 320-8333, Ext. 4303	Technical Assistance Sampling
DISTRICT OF COLUMBIA		
Hildebrand, Michael S. Coordinator, Safety and Fire Protection Noll, Gregory G. Fire and Safety Associate	American Petroleum Institute 2101 L Street, N.W. Washington, DC 20037 (202) 457-7000	Technical Assistance Risk Analysis Training
Norton, Lawrence Manager of Regulatory Affairs	National Agriculture Chemical Association 1155 15th Street, N.W. Washington, DC 20005 (202) 296-1585	Technical Assistance Information Referral Pesticide Safety Team Network
Phemister, T.A., Jr. Director	Bureau of Explosives Association of American Railroads 1920 L Street, N.W. Washington, DC 20036 (202) 835-9500	Training Technical Assistance Response
Walsh, Patrick Lieutenant	District of Columbia Fire Department 614 H Street, N.W. Washington, DC 20001 (202) HO2-1762	Training On-Scene Coordination
Zercher, John Director, Chemical Transportation Emergency Center	Chemical Manufacturers Association, Inc. 2501 M Street, N.W. Washington, DC 20037 (202) 887-1255	Information Referral CHEMTREC Response
FLORIDA		
Heiken, Jerold C. P.E., President	Hazards, Inc. Suite 231 8282 Western Way Circle Jacksonville, FL 32216 (904) 731-3432	Training and Education Fire and Industrial Risk Analysis Planning Safety Procedures

Contact	Agency	Areas of Expertise
Gore, R.G. President	Safety Systems, Inc. P.O. Box 8463 Jacksonville, FL 32239 (904) 725-3044	Training Programs, Public Safety and Industrial
GEORGIA		
O'Driscoll, J.J. Director, Safety and Hazardous Materials	Southern Railway System 185 Spring Street, S.W. Atlanta, GA 30303 (404) 529-1917	Training Programs
ILLINOIS		
Bossard, Carl D. Superintendent, Hazardous Materials	Illinois Central and Gulf Railroad Company 233 North Michigan Avenue Chicago, IL 60601 (312) 565-1600, Ext. 2488	Training Programs
Eversole, John Lieutenant	Chicago Fire Department Training Academy 558 West DeKoven Street Chicago, IL 60607 (312) 744-4732	Training Response
Stansky, C.A., Jr. Chief Chemist, Chemicals and Marketing	Process Division UOP, Inc. 20 UOP Plaza Des Plaines, IL 60016 (312) 391-2653 (O) (312) 437-0830 (H)	
IOWA		
Drummond, D.W., Ph.D. Director, Environmental Health and Safety	The University of Iowa 423 North Hall Iowa City, IA 52242 (319) 353-5125	Industrial Hygiene Safety Hazardous Waste Management Biohazard Control
Logue, Russell	Thermal Gas of Ottumwa Brick Plant Road Box 732 Ottumwa, IA 52501 (515) 294-6817	Propane
Murray, Jay Instructor	Fire Service Extension Iowa State University Fire Service Building Ames, IA 50011 (515) 294-6817	Training and Education
Sobottka, Emery Director of Environmental Health and Safety	Iowa State University 215 Nuclear Engineering Laboratory Ames, IA 50011 (515) 294-5359	Education Technical Assistance Radiation Response
Stecker, Robert H. Administrator, Prevention and Mitigation	Office of Disaster Services Hoover State Office Building Level A29 Des Moines, IA 50319 (515) 281-3231	Risk Analysis Planning

Contact	Agency	Areas of Expertise
KANSAS		
Ciccone, Stuart Captain	Training Division Wichita Fire Department City Hall, Twelfth Floor 455 North Main Street Wichita, KS 67202 (316) 268-4579	Training Response
MARYLAND		
Broumel, Thomas P. Assistant Chief Fire Investigator	Office of the State Fire Marshall 34 North Philadelphia Boulevard Aberdeen, MD 21001 (301) 272-4650	Technical Assistance Response
Burgess, William S. Chief, Spill Response Team	Maryland Water Resources Administration Tawes State Office Building Taylor Avenue Annapolis, MD 21401 (301) 269-2104 office (301) 269-3181 other hours	Oil Spills Training Response Technical Assistance
Hess, John C.	Maryland Fire and Rescue Institute University of Maryland College Park, MD 20742 (301) 454-2416	Training Planning
Isman, Warren E. Fire Chief	Montgomery County Fire and Rescue Services 101 Monroe Street Rockville, MD 20852 (301) 251-2443	Training Technical Assistance
Noll, Gregory G. Fire Fighter	c/o Berwyn Heights VFD 6796 Ruhland Drive Frederick, MD 21701 (301) 898-3539 Home (202) 857-5667 Office	Training Response
Pyle, Nelson A. Captain	Anne Arundel County Fire Department P.O. Box 276 Millersville, MD 21108 (301) 768-8723	Training Response
Walsh, Patrick	Hazardous Materials Safety 915 Cindy Lane Westminster, MD 21157 (301) 876-6948	Training On-Scene Coordination
Walters, William F. Firefighter	Washington Gas Light Co. 6801 Industrial Road Springfield, VA 22151 (703) 750-4232 (O) (703) 762-2080 (H)	Propane and Natural Gas Technical Assistance Training Hazardous Materials Response Hazardous Materials Planning

Contact	Agency	Areas of Expertise
MASSACHUSETTS		
Clougherty, E.V., Ph.D. Chemist	Boston Fire Department 115 South Hampton Street Boston, MA 02118 (617) 442-8000	Procedures Technical Assistance
Currier, John Manager, Safety	Boston and Maine Corporation North Billerica, MA 01862 (617) 667-8100	Response
Robinson, John Supervisor, Safety	Boston and Maine Corporation River Road East Deerfield, MA 01342 (413) 772-6448	Response
MICHIGAN		
Hutchenreuther, C.O.	1000 Knollwood Court Midland, MI 48640 (517) 835-5233	Technical Assistance Training Workshops
MINNESOTA		
Kuhlman, R.G. Manager, Fire and Hazardous Materials	Burlington, Northern Railroad 176 East Fifth Street St. Paul, MN 55101 (612) 298-7416	Response
Rukavina, John D., J.D. Administrative Assistant to the Chief	St. Paul Department of Fire and Safety Services 101 East Tenth Street St. Paul, MN 55101 (612) 224-7811	Training Response
Wasnick, Lloyd L. Assistant Vice President, Operations and Administration	Soo Line Railroad P.O. Box 530 Minneapolis, MN 55440 (612) 332-1261, Ext. 404	Planning Training
MISSISSIPPI		
Guice, Wade Director	Harrison County Civil Defense P.O. Box 68 Gulfport, MS 39501 (601) 864-3843	Multijurisdictional Response Plans
MISSOURI		
Bash, John E. Safety Manager	Agriculture Chemical Division Mobay Chemical Corporation P.O. Box 4913 Kansas City, MO 64120 (816) 242-2000 (816) 242-2582	Technical Assistance Response
Lehmann, Richard Instructor-Coordinator	Penn Valley Community College 3201 Southwest Trafficway Kansas City, MO 64111 (816) 932-7649	Training and Education

Contact	Agency	Areas of Expertise
Nichols, Gene Chief, Fire Operations and Training	Springfield Fire Department 235 North Kimbrough Avenue Springfield, MO 65804 (417) 864-1046	Training Response
NEBRASKA Wright, Charles Supervisor, Hazardous Materials Training	Union Pacific Railroad 1416 Dodge Street Omaha, NE 68179 (402) 271-3313	Training
Tierney, Leo C. Manager, Environmental Control	Union Pacific Railroad 1416 Dodge Street Omaha, NE 68179 (402) 271-3313	Response
NEW YORK Granito, John A. Vice President for Public Service	State University of New York, Binghamton Binghamton, NY 13901 (607) 798-6756	Training and Education Technical Assistance
Lyden, Michael E. Coordinator, Chlorine Emergency Plan	Chlorine Institute 342 Madison Avenue New York, NY 10173 (212) 682-4324	Audiovisual Training Kits Training Programs Response
OKLAHOMA Carlson, Gene P.	811 East Tyler Avenue Stillwater, OK 74074 (405) 624-5723	Training
Smith, Jerry R. Assistant Training Officer	Oklahoma City Fire Department 820 N.W. Fifth Street Oklahoma City, OK 73107 (405) 235-3314	Training
OREGON Gjersten, E.G., P.E. Registered Professional Engineer	2057 Laurence Street Klamath Falls, OR 97601 (503) 884-7870	Engineering and Hazardous Waste Technical Assistance
PENNSYLVANIA Cusick, Harry Battalion Chief, Director of Training	Philadelphia Fire Department Pennypack Street and Delaware River Philadelphia, PA 19124 (215) 335-8060	Training
McNally, J.R. Manager, Hazard Material Control	Consolidated Rail Corporation 1528 Walnut Street Philadelphia, PA 19102 (215) 893-6505	Training Technical Assistance Response

Contact	Agency	Areas of Expertise
Turk, Andrew W. Fire Prevention Administrator	Westinghouse Electric Corporation Advanced Reactor Division P.O. Box 158 Madison, PA 15663 (412) 722-5757 (412) 722-5161 (24-hour)	Training Response Firefighting (Metal) Firefighting (radiation) Regulations Planning
TENNESSEE		
Covington, James W.	1205 Wilmore Road Memphis, TN 38117 (901) 767-5736	Technical Assistance Training
Knight, Wendell M. President	Environmental and Safety Designs, Inc. (EnSafe) P.O. Box 34207 Memphis, TN 38134 (901) 372-7962	Hazardous Material: Planning, Training Programs Fire and Industry: Technical Assistance
Myers, Steven H. Environmental Control Supervisor	Aluminum Company of America Alcoa, TN 37701 (615) 977-3071	Technical Assistance Response
White, Harry E. Captain, Hazardous Materials Team	Nashville Fire Department 500 Second Avenue North Nashville, TN 37201 (615) 259-5423 (615) 327-1300 (Dispatcher)	Training Response
Wick, James A. Safety, Health, and Environmental Manager	E.I. Dupont Company P.O. Box 27038 Memphis, TN 27038 (901) 353-7100 (day) (901) 353-7123 (night) (901) 357-1546 (cyanide hotline)	Response Cyanide
TEXAS		
Anderson, S.E. Chairperson	Channel Industries Mutual Aid Association c/o Rohm and Haas Texas, Inc. P.O. Box 672 Deer Park, TX 77536 (713) 479-2861	Technical Assistance
Manager of Health and Safety	Shell Oil Company P.O. Box 2099 Houston, TX 77001 (713) 241-2822	Oil Products (Fuel) Emergency Response
Manager, Emergency Response-Oil	Shell Oil Company P.O. Box 2099 Houston, TX 77001 (713) 241-3996	Crude Oil Spills (Harbor and Rivers)
Ward, C.J. Manager, Transportation, Safety, and Regulations	Shell Oil Company P.O. Box 2099 Houston, TX 77001 (713) 241-2489	Chemical and Liquefied Petroleum Products Information

Contact	Agency	Areas of Expertise
VERMONT		
Cashman, John R. Writer, Editor, Publisher	Rural Delivery 2 Sterling Hill Barre, VT 05641 (802) 479-2307	Resource Identification Information Referral
DiVincenzo, Gerry Oil and Hazardous Materials Specialist	Hazardous Materials Management Section Department of Water Resources and Environmental Engineering State Office Building Montpelier, VT 05602 (802) 828-3395 (802) 828-3100 (Dispatcher)	Technical Assistance
Malter, John A. Chief	Hazardous Materials Management Section Department of Water Resources and Environmental Engineering State Office Building Montpelier, VT 05602 (802) 828-3395 (802) 828-3100 (Dispatcher)	Technical Assistance
Peterson, Charles President	New England Marine Contractors 1 Mill Street Burlington, VT 05401 (802) 658-1441	Oil Spill and Hazardous Waste Cleanup Transportation
Bill Barry	Department of Public Safety Civil Defense Division 132 State Street Montpelier, VT 05602 (802) 828-2163 (802) 828-3100 (Dispatcher)	Technical Assistance Training
VIRGINIA		
Mesaris, Gary Captain	Fairfax County Fire and Rescue Department 4600 West Ox. Road Fairfax, VA 22030 (703) 691-3164	Training Response Operations
Marcus, Charles B. Captain	Arlington County Fire Department 1900 South Walter Reed Drive Arlington, VA 22204 (703) 558-2909	Training
Sharp, Ronald M. Supervisor, Hazardous Materials	Norfolk and Western Railway Company 8 North Jefferson Street Roanoke, VA 24042 (703) 981-5353	Training Response Regulations

Contact	Agency	Areas of Expertise
Walters, William F.	Washington Gas Light Company 6801 Industrial Road Springfield, VA 22151 (703) 750-4232 (O) (301) 762-2081 (H)	Propane and Natural Gas Technical Assistance Response Training Hazardous Materials Response and Training
WASHINGTON		
Hedberg, Gary R. Fire Chief	Bellingham Fire Department Suite C4 1800 C Street Bellingham, WA 98225 (206) 676-6813	Technical Assistance
McAllister, Kenneth Battalion Chief	Bellevue Fire Department 666 Bellevue Way, S.W. Bellevue, WA 98004 (206) 455-6892	Risk Analysis
WYOMING		
Wyoming Disaster & Civil Defense 5500 Bishop Blvd. Cheyenne, WY 82009 (307) 777-7566	Brooke Hefner	Training Programs Planning
Wyoming Dept. of Environmental Quality 1111 E. Lincolnway Cheyenne, WY 82001 (307) 777-7781	LeRoy Feusner	Sampling Cleanup
Wyoming Dept. of Health & Social Services Hathaway Building Cheyenne, WY 82002 (307) 777-7956	Tom Schell	Radiological Advice
FEDERAL		
Craig, Jim Training Instructor	National Emergency Training Center National Fire Academy Emmitsburg, MD 21727 (800) 638-9600, Ext. 6087	Training
MILITARY		
Brown, Jerry M. Ph.D. Director of International Health Affairs	Office of Assistant Secretary of Defense (Health Affairs) Pentagon, Room 3E279 Washington, DC 20301 (202) 694-4157	Biological and Chemical Agents
Stutz, D.R., Ph.D. Lieutenant Colonel, Medical Service Corps Coordinator, Emergency Medicine	Uniformed Services University of the Health Sciences Room 2060 4301 Jones Bridge Road Bethesda, MD 20814 (301) 295-3722	Training, Emergency Medical Services
CANADA/ONTARIO		
Burrows, Douglas K. Chief of Police	Peel Regional Police Force Box 7750 7750 Hurontario Street Brampton, Ontario L6V 3W6 (416) 453-3311	Evacuation Planning

Environmental Protection Agency Regions

The Resource Conservation and Recovery Act mandated the Environmental Protection Agency (EPA) to deal with hazardous wastes and to set up EPA regions. Following is a list of the ten regions, mailing addresses for regional EPA offices, and the appropriate hazardous waste contact person for each region.

EPA REGIONS AND CONTACTS

EPA Region	Area Served	Notification Mailing Address	Hazardous Waste Contact
I	Connecticut, Maine, Massachusetts, Rhode Island, Vermont, New Hampshire	EPA Region I Permits Branch P.O. Box 8748 Boston, MA 02114	Ira Leighton Hazardous Waste Program (617) 223-3468
II	New Jersey, New York, Virgin Islands, Puerto Rico	EPA Region II Information Service Center 26 Federal Plaza New York, NY 10007	Dr. Ernest A. Regna Solid Waste Section (212) 264-0504/5
III	Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, West Virginia	EPA Region III P.O. Box 1480 Philadelphia, PA 19107	Robert L. Allen Waste Management Branch (215) 597-0980
IV	Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee	EPA Region IV RCRA Activities 345 Courtland, N.E. Atlanta, GA 30308	James H. Scarbrough Hazardous Waste Section (404) 881-3016
V	Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin	EPA Region V RCRA Activities P.O. Box 7861 Chicago, IL 60680	Karl J. Klepitsch Waste Management Branch 111 W. Jackson St. 16th Floor Chicago, IL 60604 (312) 886-7435 800-572-3176 (IL) 800-621-3192 (IN, MI, MN, OH, WI)
VI	Arkansas, Louisiana, New Mexico, Oklahoma, Texas	EPA Region VI Attn: 6 AEP 1201 Elm St. First International Bldg. Dallas, TX 75270	Ms. Pat Hull State Programs Section (214) 767-2645
VII	Iowa, Kansas, Missouri, Nebraska	EPA Region VII P.O. Box 15606 Kansas City, MO 64106	Chet McLaughlin Hazardous Waste Management Section (816) 374-6534 800-892-3837 (MO) 800-821-3714 (IA, KS, NE)

EPA Region	Area Served	Notification Mailing Address	Hazardous Waste Contact
VIII	Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming	EPA Region VIII 8AH—WM (ON) 1860 Lincoln St. Denver, CO 80295	Jon P. Yeagley Solid Waste Section (303) 837-2221 800-332-3321 (CO) 800-525-3022 (MT, ND, SD, UT, WY)
IX	Arizona, California, Hawaii, Nevada, Guam, American Samoa, Commonwealth of Northern Marianas	EPA Region IX Attn: A—3—2 215 Freemont St. San Francisco, CA 94105	Laura Yoshii State Programs Section (415) 974-8127
X	Alaska, Idaho, Oregon, Washington	EPA Region X M/S 530—A 1200 Sixth Ave. Seattle, WA 98101	Tobias A. Hegdahl Solid Waste Program (206) 442-2808 800-542-0841 (WA) 800-426-0663 (AK, ID, OR)

State Solid and Hazardous Waste Agencies

The names of firms licensed to collect, store, and/or dispose of hazardous waste are available from state environmental protection agencies. Contact the agency in your state listed here for the names of firms licensed to deal with hazardous waste in your state.

Alabama
Alfred S. Chipley, Director
Land Programs
Alabama Dept. of Environmental Mgmt.
Solid and Hazardous Waste Mgmt. Div.
State Capitol
Montgomery 36130
(205) 832-6728

Alaska
Stan Hungerford
Air & Solid Waste Management
Dept. of Environmental Conservation
Pouch O
Juneau 99811
(907) 465-2635

American Samoa
Pati Faiai, Executive Secretary
Environmental Quality Commission
American Samoa Government
Pago Pago 96799
(633-4116)

Randy Morris, Deputy Director
Dept. of Public Works
Pago Pago 97699

Arizona
R. Bruce Scott, Chief
Bureau of Waste Control
Dept. of Health Services
State Health Building, Room 202
1740 Adams St.
Phoenix 85007
(602) 255-1162

Arkansas
Wilson Tolifree, Director
Air and Hazardous Waste Mtts. Div.
Dept. of Pollution
Control and Ecology
P.O. Box 9583
8001 National Dr.
Little Rock 72219
(501) 562-7444

Randall Mathis, Director
Solid Waste Mgmt. Div.
Dept. of Pollution Control and Ecology
P.O, Box 9583
8001 National Drive
Little Rock 72219
(501) 562-7444

California
Richard Wilcoxon, Acting Chief
Hazardous Waste Management Branch
Dept. of Health Services
714 P St.
Sacramento 95814
(916) 324-1789
Terry Trumbull, Chairperson
State Solid Waste Mgmt. Board
1020-19th St., Suite 30
Sacramento 95814
(916) 322-3330

Colorado
Kenneth Waesche, Director
Waste Management Division
Colorado Dept. of Health
4210 E. 11th Ave.
Denver 80220
(303) 320-8333

Orville Stoddard, Deputy Director
Waste Management Division
Colorado Dept. of Health
4210 E. 11th Ave.
Denver 80220
(303) 320-8333

Commonwealth of North Mariana Islands
George Chan, Administrator
Division of Environmental Quality
Dept. of Public Health and
Environmental Services
Commonwealth of the North
Mariana Islands
Saipan, Mariana Islands 96950
Overseas Operator: 6984
Cable address: GOV. NMI Saipan

Connecticut
Stephen Hitchcock, Director
Hazardous Materials Management Unit
Dept. of Environmental Protection
State Office Building
165 Capitol Ave.
Hartford 06106
(203) 566-5712

Michael Cawley
Connecticut Resource Recovery
Authority
179 Allyn St., Suite 603
Professional Building
Hartford 06103
(203) 549-6390

Delaware
William Razor, Supervisor/
Resource Engineer
Solid Waste Management Branch
Dept. of Natural Resources
and Environmental Control
89 King Highway
P.O. Box 1401
Blue Hen Mall
Dover 19901
(302) 736-4781

District of Columbia
Angelos Tompros, Chief
Division of Pesticides and
Hazardous Materials
Dept. of Environmental Sciences
5000 Overlook Ave., SW
Washington, DC 20032
(202) 767-8181

Florida
Robert W. McVety, Administrator
Solid Waste Section
Dept. of Environmental
Regulations
Twin Towers Office Building
Room 421
2600 Blair Stone Rd.
Tallahassee 32301
(904) 488-0300

Georgia
John Taylor, Acting Chief
Land Protection Branch
Environmental Protection Division
Dept. of Natural Resources
270 Washington St., SW, Room 822
Atlanta 30334
(404) 656-2833

Guam
James Branch, Deputy Administrator
EPA, Government of Guam
P.O. Box 2999
Agana 96910
(646-8863)

Hawaii
Melvin Koizumi, Deputy Director
Environmental Health Division
Dept. of Health
P.O. Box 3378
Honolulu 96801
(808) 548-4139

Idaho
Robert Olson, Supervisor
Hazardous Materials Bureau
Dept. of Health and Welfare
State House
Boise 83720
(208) 334-4064

Illinois
Robert Kuykendall, Manager
Division of Land Pollution Control
Environmental Protection Agency
2200 Churchill Rd., Room A-104
Springfield 62706
(217) 782-0246
William Child, Deputy Manager
Div. of Land Pollution Control
Environmental Protection Agency
2200 Churchill Road, Room A-104
Springfield 62706
(217) 782-0245

Indiana
David Lamm, Director
Land Pollution Control Division
State Board of Health
1330 Michigan St., Room A-304
Indianapolis 46206
(317) 633-0194

Iowa
Ronald Kolpa
Hazardous Waste Program Coordinator
Dept. of Environmental
Quality
Henry A. Wallace Building
900 E. Grand Street, 3rd floor
Des Moines 50319
(515) 281-8853

Kansas
Howard Duncan, Director
Bureau of Environmental
Sanitation
Dept. of Health and Environment
Forbes Field, Building 321
Topeka 66620
(913) 862-9360, Ext. 290

Kentucky
Alex Barber, Director
Division of Waste Management
Bureau of Environmental Protection
Dept. for Natural Resources and
Environmental Protection
18 Reilly Rd.
Frankfort 40601
(502) 564-6716

Louisiana
John Koury, Administrator
Hazardous Waste Management Division
Dept. of Natural Resources
P.O. Box 44396
Baton Rouge 70804
(504) 342-1227

Gerald D. Healy, Jr., Administrator
Hazardous Waste Division
Dept. of Natural Resources
P.O. Box 44066
Baton Rouge 70804
(504) 342-1227

Maine
David Boulter, Director
Licensing and Enforcement Division
Bureau of Oil and Hazardous
Waste Materials
Dept. of Environmental Protection
State House, Station 17
Augusta 04333
(207) 289-2111

Maryland
Bernard Bigham
Waste Management Administration
Dept. of Health and
Mental Hygiene
201 W. Preston St., Room 212
Baltimore 21201
(301) 383-5740

Fred Sachs, Chief
Hazardous Waste Division
Waste Management Administration
Dept. of Health & Mental Hygiene
201 W. Preston St.
Baltimore 21201
(301) 383-5743

Ronald Nelson, Director
Waste Management Administration
Office of Environmental Programs
Dept. of Health & Mental Hygiene
201 W. Preston St., Room 212
Baltimore 21201
(301) 383-3123

Massachusetts
William Cass, Director
Division of Hazardous Waste
Dept. of Environmental Quality
Engineering
1 Winter St.
Boston 02108
(617) 292-5589

Michigan
Gary Guenther, PE, Chief
Environmental Protection Bureau
Dept. of Natural Resources
Box 30028
Lansing 48909
(517) 373-7917

Allan Howard, Chief
Office of Hazardous Waste Management
Environmental Services Division
Dept. of Natural Resources
Box 30028
Lansing 48909
(517) 373-2730

(Hazardous Waste, Liquid)
David Dennis, Chief
Oil & Hazardous Materials
Control Section
Water Quality Division
Dept. of Natural Resources
Box 30028
Lansing 48909
(517) 373-2794

(Hazardous Waste, Toxic or
Critical Materials)
Delbert Rector, Chief
Environmental Services Division
Dept. of Natural Resources
Box 30028
Lansing 48909
(517) 373-3560

John L. Hesse, Chief
Chemicals and Health Center
Michigan Dept. of Public Health
Box 30035
Lansing 48909
(517) 373-8050

Minnesota
Dale L. Wikre, Director
Solid and Hazardous Waste Division
Pollution Control Agency
1935 County Rd., B-2
Roseville 55113
(612) 296-7333

Mississippi
Jack M. McMillan, Director
Division of Solid Waste
Management
Bureau of Pollution Control
Dept. of Natural Resources
P.O. Box 10385
Jackson 39209
(601) 961-5171

Missouri
Dave Bedan, Ph.D.
Director, Waste Management
Program
Dept. of Natural Resources
State Office Building
P.O. Box 1368
Jefferson City 65102
(314) 751-3241

Montana
Duane L. Robertson, Chief
Solid Waste Management Bureau
Dept. of Health and Environmental
Sciences, Cogswell Bldg., Room A201
Helena 59602
(406) 449-2821

Nebraska
Robert Wall, Chief
Water and Waste Management Division
Dept. of Environmental Control
State House Station
P.O. Box 94877
Lincoln 68509
(402) 471-2186

Nevada
Verne Rosse
Waste Management Program Director
Division of Environmental Protection
Dept. of Conservation and
Natural Resources
Capitol Complex
Carson City 89701
(702) 885-4670

New Hampshire
Dr. Brian Strohn, Assistant Director
Office of Waste Mgmt.
Dept. of Health and Welfare
Health and Welfare Building
Hazen Dr.
Concord 03301
(603) 271-4608

New Jersey
Lino F. Pereira, Director
Solid Waste Administration
Division of Environmental Quality
Dept. of Environmental Protection
32 E. Hanover St.
Trenton 08625
(609) 292-9877

New Mexico
Jon Thompson, Chief
Community Support Services Bureau
Environmental Improvement Division
N.M. Health and Environment Dept.
P.O. Box 968
Santa Fe 87504
(505) 984-0020, Ext. 272

Ray Sisneros, Program Manager
PEM Section, Community Services Bureau
Environmental Improvement Division
N.M. Health and Environment Dept.
P.O. Box 968
Santa Fe 87504
(505) 984-0020, Ext. 275

New York
Norman H. Nosenchuck, Director
Division of Solid Waste
Dept. of Environmental Conservation
50 Wolf Rd., Room 209
Albany 12233
(518) 467-6603

North Carolina
O. W. Strickland, Head
Solid & Hazardous Waste Management Branch
Division of Health Services
Dept. of Human Resources
P.O. Box 2091
Raleigh 27602
(919) 733-2178

North Dakota
Jay Crawford, Director
Division of Environmental Waste Management and Research
Dept. of Health
1200 Missouri Ave., 3rd floor
Bismarck 58505
(701) 224-2366

Ohio
Donald E. Day, Chief
Office of Land Pollution Control
Environmental Protection Agency
P.O. Box 1049
Columbus 43216
(614) 466-8934

Chuck Wilhelm, Chief
Office of Hazardous Materials Management
Ohio EPA
P.O. Box 1049
Columbus 43216
(614) 466-7220

Oklahoma
H. A. Caves, Chief
Industrial and Solid Waste Services
Dept. of Health
P.O. Box 53551
1000 NE 10th St., Room 803
Oklahoma City 73152
(405) 271-5338

Oregon
Ernest A. Schmidt, Administration
Solid Waste Management Division
Dept. of Environmental Quality
P.O. Box 1760
522 SW Fifth Ave.
Portland 97207
(503) 229-5913

Pennsylvania
Donald A. Lazarchik
Bureau of Solid Waste Management
Dept. of Environmental Resources
Fulton Building, 8th floor
P.O. Box 2063
Harrisburg 17120
(717) 787-9870

Puerto Rico
Luis de la Cruz, Director
Solid, Toxic and Hazardous Waste Program
Environmental Quality Board
Box 11488
Santurce 00910-1488
(809) 725-8992

Rhode Island
John S. Quinn, Jr., Chief
Solid Waste Management Program
Dept. of Environmental Management
204 Cannon Building
75 Davis St.
Providence 02908
(401) 277-2797

South Carolina
Robert E. Malpass, Chief
Bureau of Solid and Hazardous Waste Management
S.C. Dept. of Health and Environmental Control
J. Marion Simms Building
2600 Bull St.
Columbia 29201
(803) 758-5681

South Dakota
Joel C. Smith, Administrator
Office of Air Quality and Solid Waste
Dept. of Water and Natural Resources
Joe Foss Building
Pierre 57501
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Spill Control Association of America

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Under the umbrella of the Spill Control Association of America (SCAA), there are a number of firms in the United States that specialize in hazardous materials spills cleanup.

The SCAA, based in Southfield, Michigan, has begun work with the American Society of Testing and Materials to develop standards for emergency response, clean-up procedures, and contractor qualifications.

The spill contractor members of SCAA have established a Contractor's Code of Ethics to:

> Pledge ourselves to advertise our services and equipment in an honest and dignified manner based upon a true cost plus a fair and reasonable profit;
>
> Pledge ourselves to advertise our services and equipment truthfully so as to fully inform our customers as to what they should expect by way of performance and cost;
>
> Pledge ourselves to work harmoniously with all those concerned with the clean-up and control of the spilled oil or hazardous substance to assure an organized and cost-effective job for our customers.

SCAA Membership List

Following is a membership list of the Spill Control Association of America (SCAA):

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Synopsis of State Regulations for Hazardous Waste

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Alabama

Relationship to Federal Regulations

On February 25, 1982, Alabama received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in Alabama are now subject to the Alabama hazardous waste management regulations in lieu of the Phase I Federal regulations adopted by EPA.

Alabama has for the most part adopted the EPA regulations, so persons familiar with the rules in 40 *CFR* Parts 260-265 should have little trouble with the Alabama regulations.

In three instances, Alabama has taken advantage of the opportunity to adopt rules that are "more stringent" than the Federal regulations.

State Law

The Alabama Hazardous Wastes Management Act of 1978 authorizes the development of a hazardous waste management program in Alabama. The law is also referred to as Act 129 of 1978. The act requires that the State Board of Health promulgate rules and regulations to insure compliance with the statute.

Alaska

Relationship to Federal Regulation

Alaska is operating under a Cooperative Arrangement with the U.S. Environmental Protection Agency (EPA) to administer the Federal hazardous waste management program in that State.

Alaska is currently drafting State hazardous waste management regulations, hopes to have them in place in July 1983, at which time it will be in a position to apply for Phase I interim authorization and perhaps Phase II interim authorization.

State Law

The development of a hazardous waste management program in Alaska is authorized by Alaska Statutes (AS) 46.03.020(10) (A), (E), and (H) and (AS) 46.03.710.

Arizona

Relationship to Federal Regulations

Arizona was granted Phase I interim authorization on August 18, 1982. The approval from the U.S. Environmental Protection Agency will allow Arizona to operate its own hazardous waste management program.

The Phase I interim authorization brings Arizona in line with the Federal standards. However, in several instances, Arizona has chosen to be "more stringent" than the Federal requirements.

State Law

Legislation concerning hazardous waste management is scattered throughout various articles of Arizona law.

Arkansas

Relationship to Federal Regulations

On November 19, 1980, Arkansas received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program. Arkansas was the first state in the nation to obtain this designation. Arkansas was granted Phase II interim authorization on April 19, 1982.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in Arkansas are now subject to the Arkansas hazardous waste management regulations in lieu of the Federal hazardous waste regulations adopted by EPA.

Arkansas has adopted by reference all of the EPA regulations found in Parts 260-267 and 122 and 124 of Title 40 of the *Code of Federal Regulations* (*CFR*), as well as adopting numerous additional "more stringent" regulations that meet the specific needs of the State.

State Law

The principal piece of legislation authorizing the establishment of a hazardous waste management program is the Arkansas Hazardous Waste Management Act (Act 406 of 1979). A secondary law concerning aspects of hazardous waste management is the Arkansas Resource Reclamation Act (Act 1098 of 1979).

California

Relationship to Federal Regulations

On June 4, 1981, California received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program. California was granted Phase II, Component A interim authorization on January 11, 1983.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in California are now subject to the California hazardous waste management regulations in lieu of the Phase I Federal hazardous waste regulations adopted by EPA.

Although California's regulations are distinctly different from the Federal regulations found in 40 *CFR* Parts 260-265, EPA has determined that they are "substantially equivalent" to the Federal regulations. However, in order to receive Phase I final authorization, California's regulations must be "equivalent" to the Federal regulations, and California must make substantial changes in its regulations.

State Law

The California Hazardous Waste Control Law of 1972, as amended, authorizes the establishment of a hazardous waste management program. This law has been amended several times, including 1980 when major changes were made to obtain Phase I interim authorization, and, more recently, in September 1981 when additional amendments were enacted by the California Legislature.

The law which governs the activities of the SWRCB is the Porter-Cologne Water Quality Control Act of 1969, as amended.

Colorado

Relationship to Federal Regulations

Colorado is currently operating under a Cooperative Arrangement with the Environmental Protection Agency (EPA) to administer the Federal hazardous waste management program in Colorado.

The State Department of Health plans to seek interim and full authorization to operate its own program sometime after July 1983. The Colorado program will be equivalent to, but not more stringent than, the Federal program.

Any manifest meeting the EPA information requirements is sufficient in Colorado.

State Law

The Hazardous Waste Act of 1981 was signed into law in late June 1981, and allows the State Department of Health to:

- Until July 1982, become involved in siting hazardous waste disposal facilities;
- After July 1983, seek interim and final authorization to administer its own hazardous waste management program in Colorado.

Connecticut

Relationship to Federal Regulations

Connecticut received Phase I interim authorization on April 21, 1982. The U.S. Environmental Protection Agency (EPA) granted its approval for Connecticut to operate its own hazardous waste management program in lieu of the Federal regulations. While essentially the same as the Federal requirements, Connecticut does have some "more stringent" regulations.

State Laws

Two laws have been enacted by the General Assembly dealing with hazardous waste management.

The first, Public Act 79-605, authorizes the Department of Environmental Protection to adopt and enforce hazardous waste management regulations. This authorization is found in Section 25-54cc(c) of the Act.

The second, Public Act 81-369, deals with siting of hazardous waste facilities, and ensures public particiption in the siting process.

Delaware

Relationship to Federal Regulations

On February 25, 1981, Delaware received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in Delaware are now subject to Delaware hazardous waste management regulations in lieu of the Phase I regulations adopted by EPA.

With one exception, Delaware has chosen to adopt by reference all of the EPA Phase I regulations adopted on May 19, 1980. The lone exception is the manifest system, which is "more stringent" than the Federal requirements.

On September 24, 1982, the Department of Natural Resources and Environmental Control adopted amendments to the Federal regulations which were adopted from May 19, 1980, through August 1981. The area of groundwater management was "more stringent" than the Federal regulations.

State Law

The Hazardous Waste Management Act of 1980 authorizes the establishment of a hazardous waste management program in Delaware. (7 Del. C. Chapter 63.)

District of Columbia

Relationship to Federal Regulations

The District of Columbia is operating under a Cooperative Arrangement with the U.S. Environmental Protection Agency (EPA) to administer the Federal hazardous waste management program in D.C.

The District hopes to have its regulations in place in mid-summer, 1982, which will put the District in the position of applying to EPA for Phase I and Phase II interim authorization in late summer, 1982.

State Law

The Hazardous Waste Management Act of 1977 authorizes the development of a hazardous waste management program in the District of Columbia.

Florida

Relationship to Federal Regulations

On May 19, 1982, Florida received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters and owners/operators of treatment, storage and disposal (TSD) facilities in Florida are now subject to the Florida hazardous waste management regulations in lieu of the Phase I regulations adopted by EPA.

Florida submitted a Phase II application to EPA in August of 1982. At this time, the state has adopted the Federal hazardous waste regulations in 40 CFR 260.10 and 261 through 265 by reference as state rules.

State Law

Florida Resource Recovery and Management Act of 1980; effective on October 1, 1980.

Georgia

Relationship to Federal Regulations

On February 3, 1981, Georgia received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program. Georgia was granted Phase II interim authorization on May 21, 1982.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in Georgia are now subject to the Georgia hazardous waste management regulations in lieu of the Phase I regulations adopted by EPA.

Georgia has basically adopted all the EPA regulations, including all amendments to the regulations through February 13, 1981. There are no parts of the Georgia regulations that are "more stringent" than the Federal requirements.

State Law

The Hazardous Waste Management Act of 1979 authorizes a hazardous waste management program in Georgia. The Hazardous Waste Management Authority Act of 1981 authorizes the Authority to construct, operate, and/or lease one or more hazardous waste facilities in Georgia.

Hawaii

Relationship to Federal Regulations

Hawaii is operating under a Cooperative Arrangement with the U.S. Environmental Protection Agency (EPA) to administer the Federal hazardous waste management program at this time.

Hawaii probably will not seek interim authorization from EPA, unless directed to do so by the State Legislature.

State Law

The Hawaii Statute on Environmental Quality (Chapter 342, Hawaii Revised Statutes) authorizes the development of a solid waste management program in Hawaii.

Draft changes to the law dealing with hazardous waste will be submitted to the next session of the Hawaii Legislature.

Idaho

Relationship to Federal Regulations

Idaho is currently operating under a Cooperative Arrangement with the Environmental Protection Agency (EPA) to administer the Federal hazardous waste management program in Idaho.

The Department of Health and Welfare intends to seek full authorization from EPA if the State Legislature passes enabling legislation in the January 1983, session.

The Idaho hazardous waste management program will be equivalent to and consistent with the Federal program.

Any manifest meeting the EPA information requirements is sufficient in Idaho.

State Law

None has been adopted at this time.

Illinois

Relationship to Federal Regulations

Illinois has applied to the U.S. Environmental Protection Agency (EPA) for Phase I interim authorization to operate its own hazardous waste management program in lieu of the EPA Phase I program. Interim authorization was granted on May 17, 1982.

Generators, transporters and owners/operators of treatment, storage and disposal (TSD) facilities will be subject to two sets of regulations—those adopted by EPA and those adopted by the Illinois Pollution Control Board.

Recognizing the problem, Illinois has tried to make certain accommodations that will lessen the impact on the regulated community.

One of the accommodations has been the adoption of Part 700: Outline of Waste Disposal Regulations. The intent of that part is that a person familiar with the EPA rules should be able to understand the essential peculiarities of the Illinois system by reading only Part 700.

Essentially, what Illinois has done is retain its existing regulations in Chapter 7 (Solid Waste) and Chapter 9 (Special Waste Hauling Regulations), while adopting regulations that are "identical in substance" with the EPA regulations in order for the State to receive Phase I interim authorization.

This process has produced a system that is "identical in substance" to the EPA regulations, but at the same time has some provisions that are "more stringent" than the EPA rules.

State Law

The Illinois Environmental Protection Act of 1970, as significantly amended in 1975, 1979 and 1981, authorizes the development of a hazardous waste management program in Illinois.

Indiana

Relationship to Federal Regulations

Indiana received Phase I interim authorization from the EPA on August 18, 1982.

Indiana generators, transporters, and owners/operators of treatment, storage and disposal (TSD) facilities will be subject to the Indiana regulations found in Article 4 of 320 Indiana Administrative Code (IAC).

Indiana has essentially adopted the EPA regulations and amendments to those regulations through January 16, 1981. The only exception is that Indiana has "more stringent" requirements for hazardous waste that is used, recycled or reclaimed.

State Law

The Indiana Environmental Management Act, as amended, gives the Indiana Environmental Management Board the authority to "regulate and require the proper and safe transportation, treatment, storage, and disposal of any hazardous waste that is generated in or transported into this State."

Iowa

Relationship to Federal Regulations

On January 26, 1981, Iowa received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in Iowa are now subject to the Iowa hazardous waste management regulations in lieu of the Federal hazardous waste regulations adopted by EPA.

The practical effect of Iowa receiving interim authorization is negligible. That's because Iowa has adopted by reference the EPA hazardous waste regulations. Thus, one familiar with the Federal hazardous waste regulations will also be familiar with Iowa's.

Iowa has adopted all EPA hazardous waste regulations and amendments through January 23, 1981. This also means that Iowa has adopted by reference EPA's Phase II, Components A and B regulations concerning permitting standards for tanks, container storage facilities, piles, storage surface impoundments, and incinerators. However, Iowa has yet to apply for, and receive, Phase II, Components A and B interim authorization. Thus, EPA retains the authority to enforce the regulations for these facilities.

State Law

The Iowa Hazardous Waste Management Act of 1979, as amended, authorizes the development of a hazardous waste management program in Iowa.

Section 11 of the Act requires that Iowa's regulations "be consistent with and not exceed" the Federal regulations.

Kansas

Relationship to Federal Regulations

On September 21, 1982, Kansas received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in Kansas are now subject to the Kansas hazardous waste management regulations in lieu of the Federal hazardous waste regulations adopted by EPA.

Kansas received Phase I interim authorization on the basis of regulations that went into effect on April 10, 1981. These rules have since been "cleaned up," and the new set of regulations went into effect as "temporary" regulations on November 4, 1981. By State law, these regulations became "final" regulations on May 1, 1982.

Kansas has adopted the Federal regulations promulgated or which will be promulgated through May 1, 1982, as well as several "more stringent" requirements to meet State needs.

State Law

The law authorizing a hazardous waste management program can be found in the Kansas Statutes Annotated, Article 34—Solid Waste and Hazardous Waste, as amended, effective July 1, 1981.

Kentucky

Relationship to Federal Regulations

On April 1, 1981, Kentucky received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program. Kentucky was granted Phase II interim authorization on January 28, 1983.

Generators, recyclers, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in Kentucky are now subject to the Kentucky hazardous waste management regulations in lieu of the Phase I Federal regulations adopted by EPA.

Kentucky's regulations have been judged to be "essentially equivalent" to the Phase I Federal regulations; nevertheless, there are several instances in which the Kentucky regulations are to some degree "more stringent" than the Federal rules.

State Law

Chapter 224 of the Kentucky Revised Statutes (KRS) authorizes the development of a hazardous waste management program in Kentucky. The law was amended in 1982 in order to provide the Cabinet with the authority necessary to implement its hazardous waste management program in line with EPA requirements. These amendments took effect on July 15, 1982.

Louisiana

Relationship to Federal Regulations

On December 19, 1980, the state of Louisiana received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in Louisiana are now subject to the Louisiana hazardous waste management regulations in lieu of the Federal hazardous waste regulations adopted by EPA.

Louisiana has made liberal use of Section 3009 of RCRA, which allows a State to adopt "more stringent" requirements than those found in the Federal regulations.

State Law

The principal piece of legislation authorizing the establishment of a hazardous waste management program is Act 334, enacted by the State Legislature in 1978. Act 334 was expanded by Act 449 of 1979 and Act 194 of 1980.

Maine

Relationship to Federal Regulations

On March 18, 1981, Maine received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in Maine are now subject to the Maine hazardous waste management regulations in lieu of the Phase I regulations adopted by EPA.

The Maine regulations are "more stringent" than the Federal regulations in three areas.

State Law

The Maine Hazardous Waste, Septage and Solid Waste Management Act of 1979, as amended in 1980 and 1981, authorizes a hazardous waste management program in Maine. Chapter 13, Subchapters I, III and IV, deal with hazardous waste management.

Maryland

Relationship to Federal Regulations

On July 8, 1981, Maryland received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in Maryland are now subject to the Maryland hazardous waste management regulations in lieu of Phase I of the Federal regulations adopted by EPA.

Maryland adopted emergency regulations on November 18, 1980, and they became final rules on April 3, 1981. The State proposed amendments to the regulations on June 26, 1981, and they became effective on January 8, 1982.

The Maryland regulations are quite similar to those adopted by EPA, with some "more stringent" requirements.

State Law

The Safe Disposal of Hazardous Substances Act of 1976 authorizes the development of a hazardous waste management program in Maryland.

Massachusetts

Relationship to Federal Regulations

On February 25, 1981, Massachusetts received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in Massachusetts are now subject to the Massachusetts hazardous waste management management regulations in lieu of the Federal Phase I regulations adopted by EPA.

Massachusetts is in the process of developing comprehensive hazardous waste regulations, which will put the State in a position to seek Phase II interim authorization. Public hearings on the proposed regulations were held in December 1981; they should be adopted in 1982.

Massachusetts first adopted hazardous waste regulations in January 1973. In November 1980 the state revised the regulations to adopt by reference all the Federal regulations (40 *CFR* Parts 260-265), as well as retain desirable portions of the earlier regulations.

The result is that, although the Massachusetts regulations have been found to be "essentially equivalent" to the EPA Phase I regulations, they are somewhat different and in some instances "more stringent" than the Federal rules.

State Law

The Massachusetts Hazardous Waste Management Act of 1979 authorizes the establishment of a statewide program to provide for the safe management of hazardous wastes.

Michigan

Relationship to Federal Regulations

The Michigan Department of Natural Resources (DNR) is pursuing Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program in lieu of the Federal program. DNR anticipates receiving Phase I interim authorization in early 1982.

Until Michigan receives Phase I interim authorization, generators, transporters and owners/operators of treatment, storage and disposal (TSD) facilities will be subject to two sets of equal, but possibly conflicting, regulations: those adopted by EPA, and those adopted by Michigan DNR.

This dual regulation is a potential problem in Michigan, because the Michigan regulations contain 34 requirements that are "more stringent" than the EPA regulations.

State Law

Act 64, approved by the Governor on July 25, 1979, authorizes the development of a hazardous waste management program in Michigan. The Act is known as the Hazardous Waste Management Act, but is also known simply as Act 64.

Minnesota

Relationship to Federal Regulations

Minnesota is currently revising its hazardous waste management regulations in order to gain final authorization from the U.S. Environmental Protection Agency (EPA).

It is hoped that the revised regulations will be adopted early in 1984, with final authorization received around August, 1984.

Until Minnesota receives Phase I final authorization, generators, transporters, and owners/operators of treatment, storage and disposal (TSD) facilities in Minnesota will be subject to two sets of different—but equal in effect—hazardous waste management regulations: Minnesota's and EPA's.

The Minnesota regulations were effective on June 18, 1979, and are quite different from the EPA regulations, which went into effect on November 19, 1980. In an effort to reduce the burden on the regulated community, on March 30, 1981, Minnesota revised its regulations to adopt certain EPA regulations, such as those on the manifest, label, exception reporting, etc.

However, Minnesota's regulations are still different from EPA's in seven areas.

State Law

Chapters 115 and 116 of the Minnesota Statutes authorize the development of a hazardous waste management program in Minnesota.

Mississippi

Relationship to Federal Regulations

On January 7, 1981, Mississippi received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program. Mississippi was granted Phase II interim authorization on August 31, 1982.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in Mississippi are now subject to the Mississippi hazardous waste management regulations in lieu of the Phase I Federal hazardous waste regulations adopted by EPA.

On July 9, 1981, Mississippi adopted by reference all the Federal regulations found in 40 CFR Parts 260-267, and 122 and 124. Thus, Mississippi's regulations are identical to those adopted by EPA.

The only "more stringent" requirement that Mississippi has adopted is a "buffer zone" siting requirement for commercial hazardous waste landfills.

State Law

Mississippi Solid Wastes Disposal Law of 1974, as amended.

Missouri

Relationship to Federal Regulations

Missouri is currently operating under a Cooperative Arrangement to administer the Federal hazardous waste management program in Missouri, while at the same time laying the groundwork to seek both Phase I and Phase II, Components A and B interim authorization from the U.S. Environmental Protection Agency (EPA).

Until Missouri receives interim authorization, generators, transporters and owners/operators of treatment, storage and disposal (TSD) facilities will be subject to two sets of regulations, both equal in effect: those adopted by EPA and those adopted by Missouri.

That could pose a problem for the regulated community because Missouri has many requirements that are "more stringent" than those found in the EPA regulations.

State Law

The Hazardous Waste Management Law of 1977, as amended in 1980, authorizes the development of a hazardous waste management program in Missouri.

Montana

Relationship to Federal Regulations

On February 26, 1981, Montana received "limited" Phase I interim authorization from the U.S. Environmental Protection Agency (EPA), and "complete" Phase I interim authorization on February 17, 1981.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in Montana are now subject to the Montana hazardous waste management regulations in lieu of Phase I of the Federal program.

The Montana regulations are identical to those adopted by the Federal government.

State Law

The Montana Hazardous Waste Act of 1981 (Senate Bill 212) authorizes the establishment of a hazardous waste management program in the State.

Section 12(8) of the Act stipulates that the Department "may not adopt rules that are more restrictive than those promulgated by the Federal government under the Resource Conservation and Recovery Act of 1976, as amended."

Nebraska

Relationship to Federal Regulations

On January 12, 1982, Nebraska applied to the U.S. Environmental Protection Agency (EPA) for Phase I interim authorization to operate its own hazardous waste management program in lieu of the Federal program.

In general, Nebraska does not have any provisions that are "more stringent" than the Federal rules.

State Law

The 1980 and 1981 amendments to the Nebraska Environmental Protection Act authorize the Department of Environmental Control to operate a hazardous waste management program.

Nevada

Relationship to Federal Regulations

Nevada is currently operating under a Cooperative Arrangement with the U.S. Environmental Protection Agency (EPA) to administer the Federal hazardous waste management program in Nevada.

The Department of Conservation and Natural Resources is currently writing regulations that will qualify for Phase I and Phase II, Components A and B interim authorization.

It is hoped these regulations will be adopted in mid- or late-1982, at which time Nevada will make application for interim authorization.

At this time, Nevada's hazardous waste management regulations contain some portions of the EPA regulations, such as identification and listing, manifest requirements, reporting and recordkeeping requirements, etc. Therefore, anyone familiar with the Federal regulations will have no problem complying with the Nevada regulations.

State Law

Assembly Bill 196, which amended Chapter 444 of Nevada Revised Statutes (NRS) by adding Sections 2 to 35, authorizes the development of a hazardous waste management program in Nevada.

New Hampshire

Relationship to Federal Regulations

On November 3, 1981, New Hampshire received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in New Hampshire are now subject to the New Hampshire hazardous waste management regulations in lieu of Phase I of the Federal program.

New Hampshire has adopted regulations that are "substantially equivalent" to the Federal regulations, but has taken advantage of the opportunity to adopt "more stringent" requirements.

State Law

Chapter 347, establishing a hazardous waste management program, was enacted July 1, 1979. The law (RSA 47A) was amended in 1981.

New Jersey

Relationship to Federal Regulations

In November 1981, New Jersey applied to the U.S. Environmental Protection Agency (EPA) for Phase I interim authorization to operate its own hazardous waste management program in lieu of the Federal program. Approval was granted on February 2, 1983.

New Jersey's regulations contain several provisions that are "more stringent" than those found in the Federal regulations.

State Law

The New Jersey Solid Waste Management Act of 1975, as amended, authorizes the development of a hazardous waste management program in that State.

New Mexico

Relationship to Federal Regulations

New Mexico is operating under a Cooperative Arrangement with the U.S. Environmental Protection Agency (EPA) to administer the Federal hazardous waste management program in that State.

The Environmental Improvement Division (EID) is updating its regulations, hopes to have the process complete by the end of 1983, and at that time will apply to EPA for interim authorization to operate its own program in lieu of the Federal program.

Until that time, generators, transporters, and owners/operators of TSD facilities will be subject to two sets of different—but equal— hazardous waste management regulations: those adopted by EPA and those adopted by EID.

That shouldn't be much of a problem, however, because New Mexico's regulations are not in great conflict with EPA's. The only potential problem is that New Mexico allows disposal on site without a permit, while EPA requires a permit for on-site disposal. However, in practice all New Mexico on-site disposal facilities have obtained interim status under the EPA regulations.

The new regulations, when adopted, will closely parallel the EPA regulations, and there shouldn't be any "more stringent" requirements.

State Law

The Hazardous Waste Act of 1977, as amended in 1981, authorizes the development of a hazardous waste management program in New Mexico.

New York

Relationship to Federal Regulations

On January 12, 1982, New York applied for Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program in lieu of Phase I of the Federal program.

Until New York receives Phase I interim authorization, which is expected in late spring or early summer 1982, generators, transporters, and owners/operators of treatment, storage and disposal (TSD) facilities will be subject to two sets of regulations, both equal in effect: the New York regulations and the EPA regulations.

While New York's regulations "incorporate" the EPA regulations, New York's regulations are "more stringent" than the Federal requirements in 10 significant areas.

State Law

The Industrial Hazardous Waste Management Act of 1978 and the 1979 amendments to the Environmental Conservation Law form the basis for legislative authority to operate a hazardous waste management program in New York.

North Carolina

Relationship to Federal Regulations

North Carolina received Phase I interim authorization on December 18, 1980, and Phase II, Components A and B, interim authorization on March 26, 1982, from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners/operators of treatment, storage and disposal (TSD) facilities in North Carolina are now subject to the North Carolina hazardous waste management regulations in lieu of the Phase I and Phase II, Component A and B Federal regulations adopted by EPA.

North Carolina has adopted all of the EPA regulations and amendments through July 1982; thus, no North Carolina regulations are "more stringent" than the Federal regulations.

However, the 1981 amendments to the North Carolina Solid Waste Management Act allows North Carolina to be more stringent in siting of TSD facilities. Regulations carrying out the intent of the amendments have not yet been adopted.

State Law

The Solid Waste Management Act of 1979 authorizes the development of a hazardous waste management program in North Carolina. The law prohibits any of the North Carolina regulations from being "more stringent" than the Federal regulations.

However, 1981 amendments to the Act authorize "more stringent" regulations in location of the TSD facilities.

North Dakota

Relationship to Federal Regulations

North Dakota received "limited" Phase I interim authorization from the Environmental Protection Agency (EPA) on December 12, 1980.

This means that North Dakota requirements for disposal facilities supersede EPA requirements; all Federal requirements applicable to generators, transporters, and storage and treatment facilities continue to apply in North Dakota.

As soon as hazardous waste regulations are in place, North Dakota intends to seek full authorization status.

State Law

The North Dakota Hazardous Waste Management Act (North Dakota Century Code 23-20-3), effective July 1, 1981, authorizes the State Department of Health to develop and administer a hazardous waste management program in the state.

Ohio

Relationship to Federal Regulations

On January 12, 1982, Ohio submitted an application for Phase I interim authorization to the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program in lieu of the Federal program.

Until Ohio receives Phase I interim authorization, generators, transporters, and owners/operators of treatment, storage and disposal (TSD) facilities will be subject to two sets of regulations: those adopted by EPA and those adopted by Ohio.

This shouldn't be much of a problem, however, because Ohio's regulations are nearly identical to the Federal regulations. Ohio does require a separate registration of transporters which is similar to Federal notification, and Ohio will continue to require annual reports, independent of any Federal change.

Ohio is currently in the process of seeking changes in its hazardous waste law, which will enable the State to seek Phase II interim authorization from EPA.

State Law

Senate Bill 269 (Chapter 3734), signed on October 9, 1980, authorizes Ohio EPA to develop a hazardous waste management program. Essentially, the law directs Ohio EPA to adopt regulations which are "consistent with and substantially equivalent to" the regulations adopted by EPA. These statutory requirements effectively lock the State into adopting regulations identical to the Federal rules. However, the law allows the director of Ohio EPA to adopt regulations in areas of hazardous waste management in which EPA has chosen not to develop regulations.

Oklahoma

Relationship to Federal Regulations

On January 14, 1981, Oklahoma received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in Oklahoma are now subject to the Oklahoma hazardous waste management regulations in lieu of the Federal hazardous waste regulations adopted by EPA.

Oklahoma has revised its regulations and has applied for Phase II, Components A and B interim authorization. The amendments went into effect on February 9, 1982. Phase II was granted on December 13, 1982.

Oklahoma has taken advantage of the opportunity to adopt "more stringent" requirements than those found in the EPA regulations.

State Law

The Oklahoma Controlled Industrial Waste Disposal Act of 1976, as amended in 1978, 1979, 1980 and 1981, authorizes a hazardous waste management program in Oklahoma.

It should be noted that the Act uses the term "controlled industrial waste" as a definitive phrase rather than the term "hazardous waste" used in the Federal program. For all intents and purposes, the terms have the same meaning.

Oregon

Relationship to Federal Regulations

On July 16, 1981, Oregon received Phase I interim authorization from the U.S.

Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in Oregon are now subject to the Oregon hazardous waste management regulations in lieu of the Phase I Federal hazardous waste regulations adopted by EPA.

Although Oregon's regulations are significantly different than the Federal regulations found in 40 *CFR* Parts 260-265, EPA has determined that they are "substantially equivalent" to the Federal regulations. However, in order to receive final authorization, Oregon's regulations must be "equivalent" to the Federal regulations, and the State must make substantial changes in its regulations.

State Law

The State Waste Control Act of 1969, as amended as recently as mid-1981, authorizes the development of a hazardous waste management program in Oregon. The law can be found in the Oregon statutes, Chapter 459.

Transporters are regulated under the authority of Oregon statutes, Chapters 484, 756 and 767.

Pennsylvania

Relationship to Federal Regulations

On May 26, 1981, Pennsylvania received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners and operators of treatment, storage, and disposal (TSD) facilities in Pennsylvania are now subject to the Pennsylvania hazardous waste management regulations in lieu of the Federal hazardous waste regulations adopted by EPA.

Pennsylvania has taken advantage of the opportunity to adopt requirements that are "more stringent" than those found in the Federal regulations.

State Law

The Pennsylvania Solid Waste Management Act of 1980 authorized the development of a hazardous waste management program in that State. All rules and regulations are promulgated under the authority of Article IV, Section 401 of the Act.

Rhode Island

Relationship to Federal Regulations

On May 29, 1981, Rhode Island received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in Rhode Island are now subject to the Rhode Island hazardous waste management regulations in lieu of the Federal Phase I regulations adopted by EPA.

While Rhode Island's regulations have been judged to be "substantially equivalent" to the Federal regulations, Rhode Island has taken advantage of the opportunity to adopt many "more stringent" requirements.

State Law

The Hazardous Waste Management Act of 1978 authorizes the development of a hazardous waste management program in Rhode Island.

South Carolina

Relationship to Federal Regulations

On February 24, 1981, South Carolina received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program. Phase II interim authorization was granted on November 3, 1982.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in South Carolina are now subject to the South Carolina hazardous waste management regulations in lieu of Phase I of the Federal program.

While South Carolina's regulations have been judged to be "substantially equivalent" to the Federal regulations, South Carolina has taken advantage of the opportunity to adopt many "more stringent" requirements.

State Law

The Hazardous Waste Management Act of 1978 authorizes the development of a hazardous waste management program in South Carolina. The Act was last amended in 1981.

South Dakota

Relationship to Federal Regulations

Currently, South Dakota is operating under a Cooperative Arrangement with the Environmental Protection Agency (EPA) to administer the Federal hazardous waste management program in South Dakota.

However, in the near future South Dakota expects to receive full interim authorization from EPA to operate its own hazardous waste management program in the State.

This will have little, if any, practical effect since South Dakota has adopted regulations equivalent to the Federal guidelines.

South Dakota expects to revise its regulations in the near future to adopt amendments to the Federal regulations which have been promulgated since May 19, 1980. This will put the State in a position to apply for full authorization.

State Law

Solid Waste Disposal (Chapter 34A-6) authorizes a hazardous waste management program in South Dakota.

Tennessee

Relationship to Federal Regulations

On July 16, 1981, Tennessee received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners/operators of treatment, storage and disposal (TSD) facilities in Tennessee are now subject to the Tennessee hazardous waste management regulations in lieu of the Phase I Federal regulations adopted by EPA.

While Tennessee's regulations have been judged to be "substantially equivalent" to Phase I of the Federal regulations, Tennessee has adopted several "more stringent" requirements.

State Law

The Tennessee Hazardous Waste Management Act of 1975, as amended most recently in 1981, authorizes the development of a hazardous waste management program in Tennessee.

Texas

Relationship to Federal Regulations

On December 14, 1980, Texas received Phase I interim authorization and on March 12, 1982, Phase II, Components A and B interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners/operators of treatment, storage and disposal (TSD) facilities in Texas are now subject to the Texas hazardous waste management regulations in lieu of the Phase I and Phase II, Components A and B of the Federal regulations.

The Texas regulations are "substantially equivalent" to the Federal regulations; however, Texas has adopted three "more stringent" requirements.

State Law

The State of Texas Solid Waste Disposal Act (Article 4477-7 of the Revised Civil Statutes), last amended in 1981, authorizes the development of a hazardous waste management program in Texas.

Utah

Relationship to Federal Regulations

On December 12, 1980, Utah received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in Utah are now subject to the Utah hazardous waste management regulations in lieu of the Phase I Federal regulations adopted by EPA.

Utah's regulations are "essentially equivalent" to the Federal regulations, and Utah does not have any "more stringent" provisions. Thus, one familiar with the EPA regulations should have no problems with the Utah regulations.

State Law

The Utah Hazardous Wastes Act of 1979 authorizes the development of a hazardous waste management program in Utah.

Vermont

Relationship to Federal Regulations

On January 8, 1981, Vermont received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in Vermont are now subject to the Vermont hazardous waste management regulations in lieu of the Phase I Federal regulations adopted by EPA.

While Vermont's regulations have been judged "substantially equivalent" to Phase I of the Federal regulations, Vermont's regulations are in a different format and in some instances contain some significant "more stringent" requirements.

State Law

Chapter 159 (Solid Waste Management) of Title 10 of the Vermont Statutes Annotated, as amended in 1981, authorizes the development of a hazardous waste management program in Vermont.

Virginia

Relationship to Federal Regulations

On November 3, 1981, Virginia received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners and operators of treatment, storage, and disposal (TSD) facilities in Virginia are now subject to the Virginia hazardous waste management regulations in lieu of Phase I of the Federal regulations.

The Virginia regulations are "substantially equivalent" to Phase I of the Federal regulations. Virginia has two provisions that are "more stringent" than the Federal regulations.

State Law

Chapter 6, Title 32.1, Article 3, Solid Waste Management, Code of Virginia, authorizes the development of a hazardous waste management program in Virginia.

Washington

Relationship to Federal Regulations

The State of Washington was expected to apply to the U.S. Environmental Protection Agency (EPA) in March 1982, for Phase I and Phase II, Components A and B interim authorization to operate its own hazardous waste management program in lieu of the Federal program.

Until Washington receives interim authorization, generators, transporters, and owners/operators of treatment, storage and disposal (TSD) facilities will be subject to two sets of regulations, both equal in effect. They are the EPA regulations and those adopted by the State of Washington.

State of Washington officials advise individuals to follow the State regulations, because they are equivalent to—and in some instances exceed—the Federal regulations. The State of Washington has adopted several "more stringent" requirements than those found in EPA regulations.

State Law

The Hazardous Waste Disposal Act of 1976 (Chapter 70.105RCW) authorizes the development of a hazardous waste management program in the State of Washington.

West Virginia

Relationship to Federal Regulations

West Virginia is operating under a Cooperative Arrangement with the U.S. Environmental Protection Agency (EPA) to administer the Federal hazardous waste management program in West Virginia.

West Virginia has proposed hazardous waste management regulations, and should have them in place in spring, 1982.

West Virginia hopes to seek Phase I and Phase II final authorization from EPA in 1983.

State Law

The Hazardous Waste Management Act of 1981 authorizes the development of a hazardous waste management program in West Virginia.

Wisconsin

Relationship to Federal Regulations

On January 15, 1982, Wisconsin received Phase I interim authorization from the U.S. Environmental Protection Agency (EPA) to operate its own hazardous waste management program.

Generators, transporters, and owners and operators of treatment, storage and disposal (TSD) facilities in Wisconsin are now subject to the Wisconsin hazardous waste management regulations in lieu of Phase I of the Federal program.

Although Wisconsin's regulations are "substantially equivalent" to the Federal regulations, the Wisconsin Department of Natural Resources has taken advantage of the opportunity to adopt requirements that are "more stringent" than the Federal requirements.

State Law

The Hazardous Waste Management Act, found in Sections 144.60 to 144.74 of the Wisconsin Statutes, authorizes a hazardous waste management program in Wisconsin.

Wyoming

Relationship to Federal Regulations

The Environmental Protection Agency (EPA) is operating the Federal hazardous waste management program in Wyoming.

Wyoming withdrew its Cooperative Arrangement in June 1981, to operate the Federal hazardous waste management program in that State when it became apparent that the Wyoming legislature would not adopt the necessary legislation.

Until necessary legislation is enacted, Wyoming will not be in a position to seek interim authorization from EPA.

State Law

The Wyoming Environmental Quality Act, Article 5, authorizes the Director of Environmental Quality to:

- Coordinate the activities of all state agencies concerned with solid waste management and disposal;
- Promulgate rules and regulations for operation of solid waste disposal sites;
- Request solid waste disposal site plans for approval from any person or municipality that proposes to establish or is presently operating a solid waste disposal site.

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CHEMTREC — 800-424-9300

CHEMTREC is the Manufacturing Chemists Association's name for its Chemical Transportation Emergency Center. The Center provides immediate information on what to do in case of spills, leaks, fires or exposures on receipt of a phone call from the scene of a chemical transportation accident.

Personnel of fire, police and other emergency services, as well as of carriers or anyone needing assistance regarding chemicals in a transportation emergency, can use this service by calling the toll-free phone number 800-424-9300. For calls from Washington, D.C., use 483-7616; Alaska and Hawaii use 202-483-7616. The caller will be asked to identify the accident location, the name of the chemical product(s), the nature and extent of the accident, the shipment source, name of the company that made shipment, the carrier and the consignee, whether there are injuries, and any local conditions that may affect the hazard. The CHEMTREC Communicator will provide the caller with pre-established information on file such as the kind of hazards to be expected from the product involved, and what to do in case of spills, leaks, fire or exposure. The Communicator then will relay the details of the accident immediately by phone to the shipper, who becomes responsible for any future action in regard to the emergency.

Poison Control Centers

A list of facilities which provide medical information on a 24-hour daily basis, concerning the prevention and treatment of accidents involving ingestion of poisonous and potentially poisonous substances, titled "Directory of Poison Control Centers," has been compiled by the National Clearinghouse for Poison Control Centers, Division of Direct Health Services, Bureau of Health Services, Public Health Service, U.S. Department of Health, Education, and Welfare, Public Health Service Publication No. 1278 (Revised May 1967). For sale by Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

WE WANT TO KNOW . . .
if a name, an address, or a phone number has changed; if there's an upcoming event, a new program or course, a new publication being offered. If you have more current information than is contained in this *Almanac*, know something that should be included in this book, or just have something interesting about the fire protection scene that you want to contribute, please let us know. Write: Editor, *Fire Almanac*, NFPA, Batterymarch Park, Quincy, MA 02269. All suggestions will receive our careful attention.

International Fire Protection

International Fire Experience

As documented by the National Fire Protection Association and other sources, the fire problem in the United States is quite complex and is influenced by many aspects of the physical environment in which Americans live and the American lifestyle. So it is very interesting to ask how variations in such influences among countries might be reflected in their fire experience. It is possible that this kind of inquiry could identify fire protection lessons that are transferable among nations and thus of great benefit in reducing fire losses. For this reason, a number of studies have been made that try to establish benchmark international comparisons of fire experience upon which further research could be based. Such work has been done by Wilmot[1] in Europe and by The Georgia Institute of Technology[2] and the NFPA[3] in the United States.

The results of these efforts to compare fire experience among nations must thus far be regarded as preliminary and tentative. This caution is necessary because of wide disparities among nations in methods for collecting and analyzing fire experience data. Despite these difficulties, a number of findings have emerged that raise questions worthy of comment and further study. The results of The Georgia Institute of Technology research are the most recent available and will be used to discuss selected international comparisons.

Comparisons of Selected Fire Experience Statistics

1. Fire Loss in Relation to Gross National Product

Figure 1 displays loss in building fires as a percent of gross national product for selected countries. Gross national product is a measure of the total value of goods and services produced by a country and is thus an indicator of the overall level of economic activity. For the 1979-1980 period, the United States was eighth highest among the eleven nations reporting this statistic.

2. Fire Loss in Relation to National Population

Figure 2 displays monetary loss per person in building fires for selected countries. For the 1979-1980 period, the United States was seventh highest among the eleven nations reporting this statistic.

3. Fire Loss in Relation to Number of Fires

Figure 3 displays monetary loss in building fires divided by the number of building fires reported for selected countries. For the 1979-1980 period, the United States was ninth highest among the ten nations reporting this statistic.

4. Number of Building Fires in Relation to National Population

Figure 4 displays the number of building fires per thousand persons reported for selected countries. For the 1979-1980 period, the United States was second highest among the twelve nations reporting this statistic.

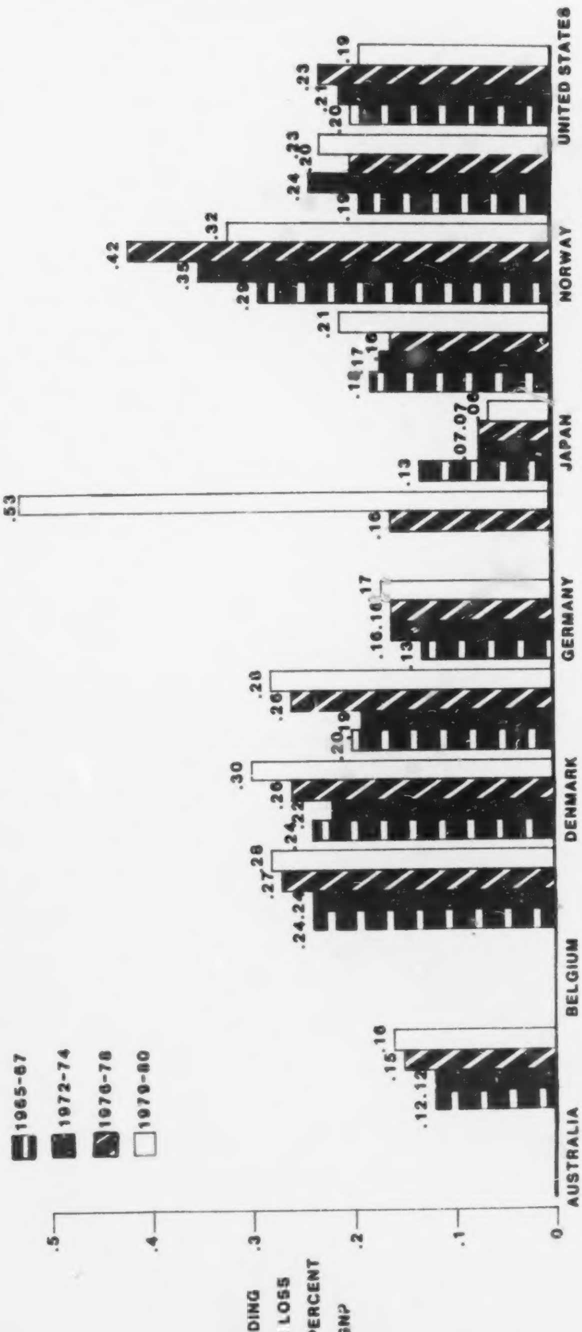
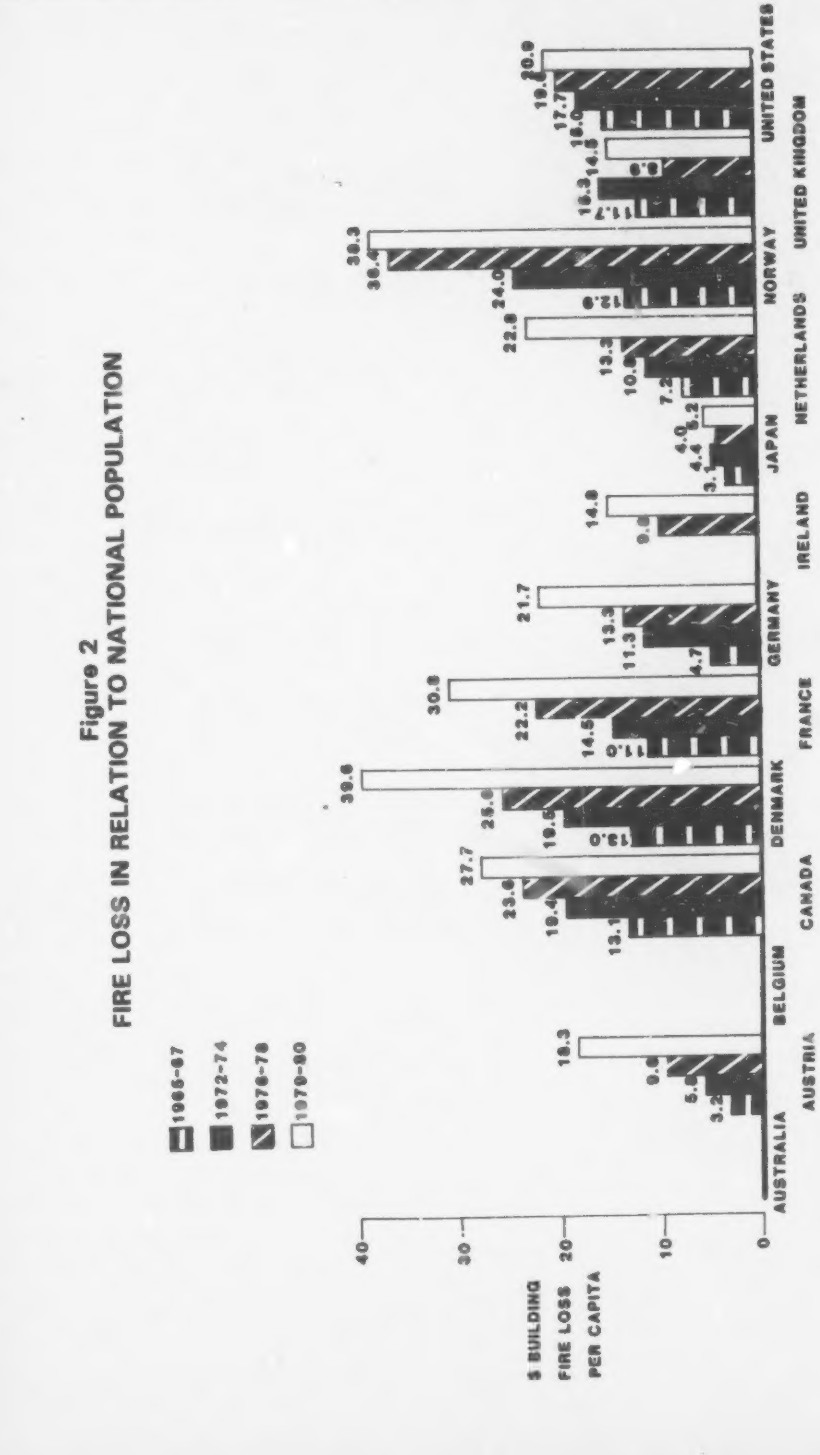


Figure 1
FIRE LOSS IN RELATION TO GROSS NATIONAL PRODUCT

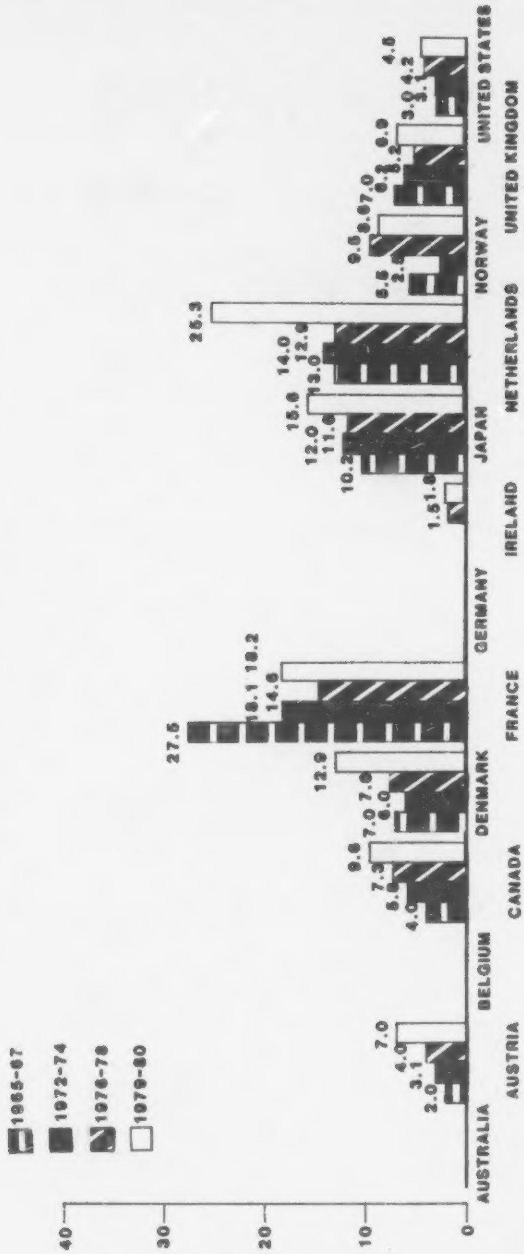
Courtesy Georgia Institute of Technology

Figure 2
FIRE LOSS IN RELATION TO NATIONAL POPULATION



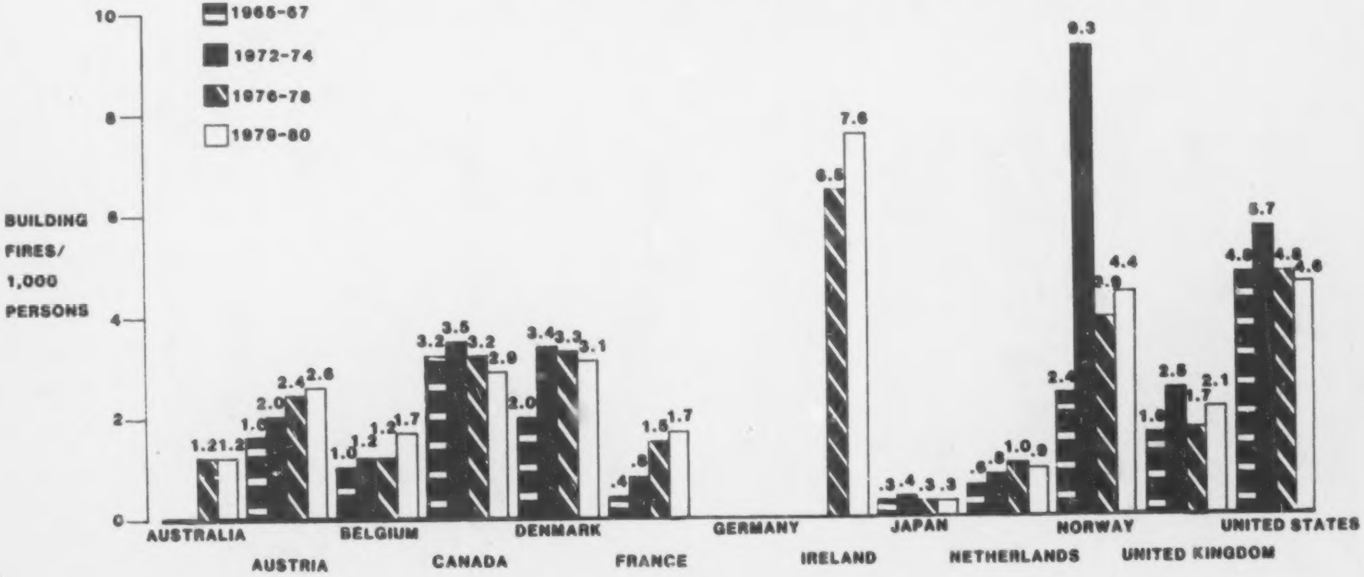
Courtesy Georgia Institute of Technology

Figure 3
FIRE LOSS IN RELATION TO NUMBER OF FIRES



Courtesy Georgia Institute of Technology

Figure 4
NUMBER OF BUILDING FIRES IN RELATION TO NATIONAL POPULATION



Notes: Values for current time period are taken from Table 2-1 of the document. Values for earlier time periods, other than death data, are taken from earlier Gerogia Tech reports [2, 28].

Death values are from *WHO Statistics Annual: Vital Statistics and Causes of Death* [29] and reflect an average for the time period indicated.

Courtesy Georgia Institute of Technology

5. Fire Deaths in Relation to National Population

Figure 5 displays the number of fire deaths per million persons reported for selected countries. Death data are from the World Health Organization (WHO) and exclude two categories of fire deaths in order to avoid double counting in the WHO statistical system. These categories are deaths in vehicle fires (classified as transportation deaths) and deaths known to have occurred in arson fires (classified as homicides). For the most recent year reported, the United States is tied with Canada for first place among the thirteen nations reporting this statistic.

6. Fire Deaths in Relation to Number of Fires

Figure 6 displays the number of fire deaths per thousand building fires reported for selected countries. For the most recent year reported, the United States is eighth highest among the twelve nations reporting this statistic.

Important Similarities in the Fire Problem

Figures 1 through 6 display many striking contrasts in the fire problem as reported by various nations. However, in the face of such differences, a number of key facts about the fire problem stand out in common among many nations. These include:

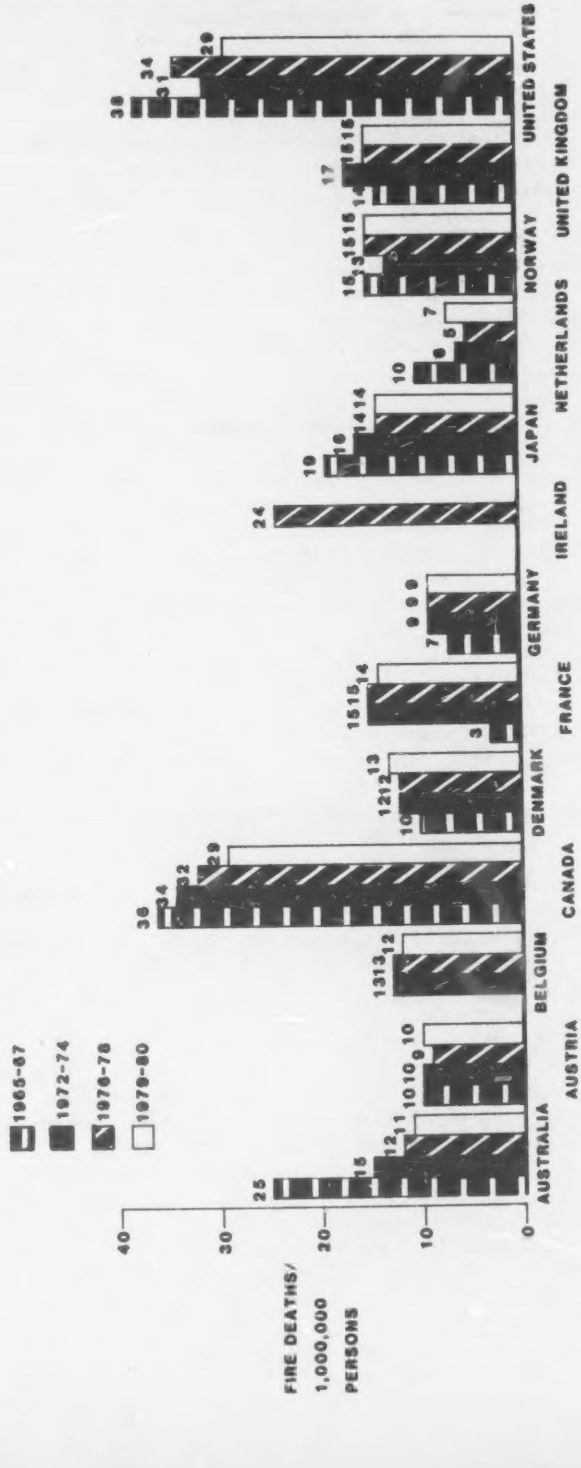
1. Deaths are heavily concentrated in residential fires. For six countries reporting the statistic, the ratio of residential to nonresidential fire deaths ranged from 8.0 to 12.0.
2. For all nations reporting, men are at greater risk than women of becoming victims of fire.
3. For all nations reporting, the very young and the very old make up a disproportionate number of fire victims.
4. Throughout the world, concern about the problem of arson is growing. For example, in the state of New South Wales in Australia a new Standing Committee on Arson has recently been formed with the objective of coordinating the fight against the rapidly increasing crime of arson there. In England a government study estimated that in 1977 arson was responsible for one third of all fire losses.

Possible Reasons for Differences in National Fire Experience

The underlying reasons for contrasts in national fire experience are not well understood. Differences are often very puzzling; this is particularly the case when compared nations seem to have comparable fire hazards but report appreciably differing fire statistics. For example, there is little uniformity worldwide in procedures for collecting fire experience data and in corresponding statistical methods for analyzing these data. Researchers in this field are well aware that instances of seemingly different fire experience may result merely from such differences in collection and analysis methods. Another difference is the substantial variations in cultural attitudes to fire and to the conservation of available resources. For example, in Japan fire has always been considered a very great danger, and the Japanese have a correspondingly high awareness of firesafety. Other possible reasons for differences in national fire experience may be:

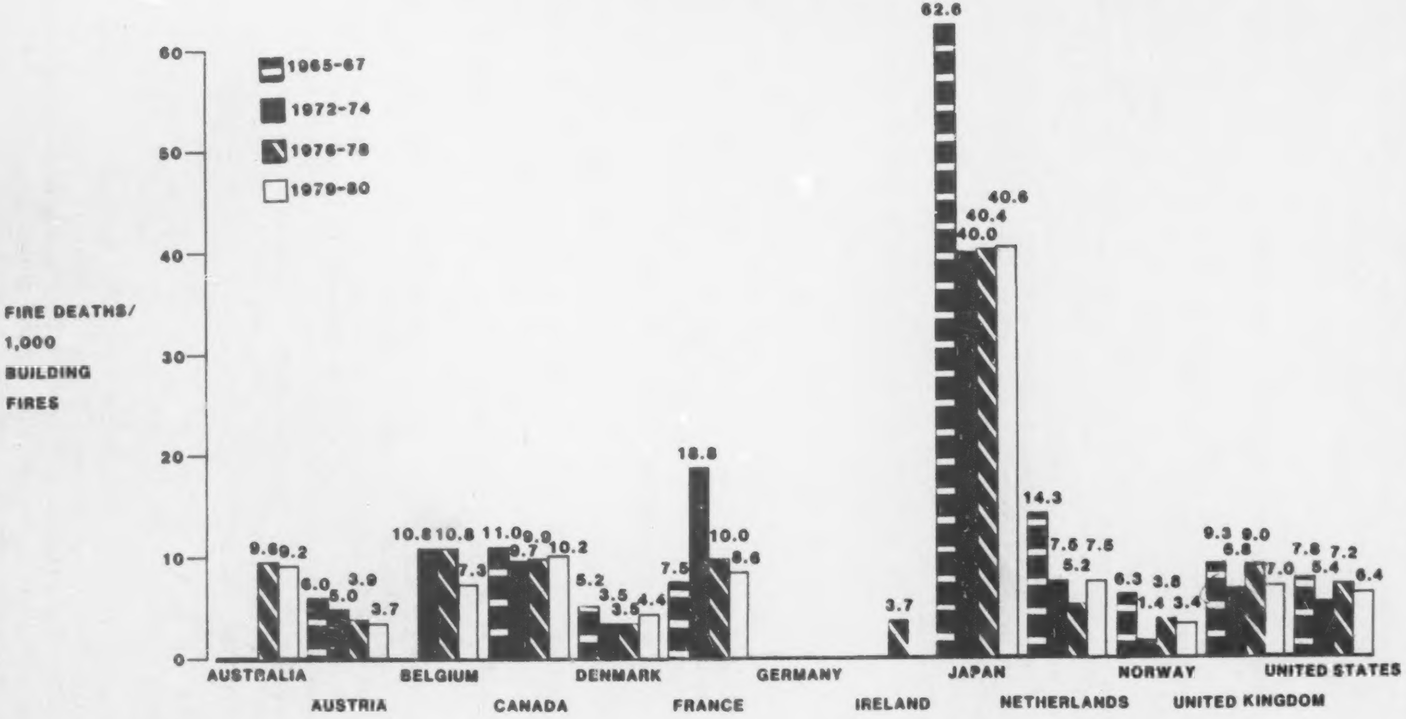
- Effectiveness of fire prevention and fire protection programs.
- Effectiveness of firesafety codes and standards.
- The relation among the level of application of fire protection technology, fire service resources, and the level of hazards created by new development.
- Building construction.
- Levels of economic and technological development.
- Climate.

Figure 5
FIRE DEATHS IN RELATION TO NATIONAL POPULATION



Courtesy Georgia Institute of Technology

Figure 6
FIRE DEATHS IN RELATION TO NUMBER OF FIRES



Courtesy Georgia Institute of Technology

- Extent of insurance coverage and business practices of insurers.
- Demographic characteristics of residential populations.
- Occupancy patterns and building usage.

Efforts to Improve International Fire Statistics

As noted at the beginning of this chapter, research on international fire experience has been active during the last several years in Europe and the United States. Announcement has recently been made of the formation of the World Fire Statistics Centre in Geneva with the aim of encouraging better world fire cost statistics. The Centre is affiliated with the Association Internationale pour l'Etude de l'Economie de l'Assurance (Geneva Association) and has cooperated with the United Nations Economic Commission for Europe in a pilot project to improve statistics for four European nations (United Kingdom, Denmark, France, and Hungary). In addition, the Centre is organizing, through the Geneva Association, an international seminar on fire statistics to be held in Geneva in March 1983. For more information about the Centre, please contact:

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References

[1]Tom Wilmot, "European Fire Costs: The Wasteful Statistical Gap," *The Geneva Papers on Risk and Insurance*, No. 13, (October 1979).

[2]Jerry Banks, *Selected International Comparisons of Fire Loss, 1979-1980*, Georgia Institute of Technology, September 1982 (supported by the Federal Emergency Management Agency).

[3]*Fire Protection Handbook*, 15th edition, NFPA, 1981, pp. 2-15 to 2-16 and 2-33 to 2-34.

The Global Fire Problem

The summaries in this article are taken from remarks made by delegates from the fire protection associations of each of the countries represented in this survey at the International Fire Protection Organizations Conference held September 15-18, 1982 at the National Fire Protection Association's headquarters in Quincy, MA. The conference brought together delegates from five continents for papers and discussions on the world's major fire problems. As the summaries illustrate, the residential fire problem in Europe is almost negligible, while in the U.S. it is the major source of fatal fires and the nation's worst fire problem.

Belgium

Belgium's low fire death rate of 100 fire deaths per year in a population of about 1,000,000 people is not an incentive for much legislation in favor of residential fire protection. In 1967, a fire that took over 350 lives in a Belgian department store led to regulations governing fire protection in industrial and commercial occupancies. However, there are few laws governing fire protection in places of assembly.

The National Council for Fire Prevention aims to see that legislation is enacted to regulate fire protection in places of assembly and existing hotels. The Council also aims to develop a standard for the approval of fire protection and building materials; public information about firesafety, since none is distributed; and a study of the arson problem in Belgium.

(Summarized from remarks made by H. Aresu de Seui, Director of A.N.P.I., Brussels, Belgium.)

Colombia

Colombia's recent entry into the group of semi-industrial nations has brought with it many new problems and intensified old ones, among them fire. Until recently, a way to come to grips with the fire problem was not available. Statistics about fire are poor since there is no uniform reporting procedure for fires. There are only about 140 fire departments in a country with nearly 1,000 communities and 85 percent of these are volunteer. There is no official law, code, or standard for firesafety and no building code. Thus, there are no mechanisms for approving building plans nor for on-site inspections during and after construction. Until 1981, there were no courses taught about fire protection in engineering and architectural schools.

It is known that in 1980 over 500 people were killed by fire in Colombia, or 20 deaths per one hundred million. Two hundred of these deaths were children under 14 years old. During that same year, more than 8,000 people were hospitalized and over 24,000 received some kind of medical attention for burns caused by fire, explosion, and chemicals.

According to fire department reports, 60 percent of fires occur during the day and 40 percent at night. Also according to their reports, only 20 percent of the fire locations had some kind of fire prevention equipment (mainly fire extinguishers) and only 8 percent had fire insurance coverage. Statistics from four major cities indicate that 60 percent of their fires are in private residences, while the construction industry estimates residential fires comprise 80 percent of all fires. These cities cited electrical causes in 25 percent of the fire incidences and arson in 8 percent. In Colombia's principal city of Bogota, the fire department attended over 4,000 calls in 1981, of which 810 were fires. The department has 300 paid units serving a population of 4.5 million from seven stations. The chief commander is a police officer appointed for one year as a training assignment.

Colombia's combination of tropical climate and high altitudes creates special fire problems. At high elevations, such as in Bogota located over 8,500 feet above sea level, a cigarette that will burn out in 2.5 minutes at sea level will take 5 minutes to burn out. The combustible load is high in such high elevations where temperatures may dip to 32°F at night after daytime highs in the 80s. Construction materials are mainly brick and concrete, although wood with clay and earth plaster may be used in old construction. Since heating and air conditioning are almost nonexistent, neither of these present fire problems. In elevations less that 3,000 feet below sea level, the combustible load is low — interior furnishings are of noncombustible materials, and furniture is a metallic type with low amounts of combustible materials. Construction features open structures with large spaces and high ceilings.

Industrial growth has contributed to the fire problem. Cities are growing fast and, with the population increase, high-rise buildings for combined living and business use and large shopping centers are being built. In this new construction, more combustible materials are being used, for example, plastics for walls, floors, carpeting, furniture, equipment, pipes, and electric wiring. And more and more, large concentrations of combustible materials can be found in warehouses, shopping centers, and oil and gas storage centers. In the future, gas lines from the large depots of natural gas will be run under streets and buildings, thus increasing the fire problem in cities.

Colombia is beginning to deal with its fire problems. The national government recently passed a law stating that structures housing more than one family must have fire protection and adequate means of egress, with the provision that the law can be amended to include new technological developments. The National Institute of Standards (ICONTEC) is preparing fire protection standards that when approved will be enforced under the national law.

Standards for fire extinguishers, extinguishing agents, and standpipes have been approved, as well as a life safety code and general electrical code. Standards for sprinklers, fire detection and alarm systems, and the combustibility of materials are currently being developed. Before the codes and standards are enforced as law, they are tested on the one fire department in the country that has a preventative-oriented policy.

In the last couple of years, insurance companies have established Technical Prevention Departments. These departments are staffed with engineers who appraise risks and assist clients in correcting fire hazards. Some engineering and business administration schools have introduced fire protection as part of their general safety and occupational health curriculums.

These improvements in firesafety are supported and encouraged by the Consejo Colombian de Seguidad, a national safety council established in 1953. This nonprofit organization is involved in teaching and training people about firesafety and in promoting firesafety among the general public.

(Summarized from remarks made by Dr. Hector Angel, President, Consejo Colombian de Seguidad, Bogota, Colombia.)

Denmark

According to the Danish Fire Protection Association (DFPA), Denmark's worst fire problem is people, specifically their lack of concern about firesafety. To increase the public awareness about firesafety, the DFPA sponsors short film spots on television, radio programs on general fire risks, and articles and press releases in Danish newspapers and magazines.

In addition to an overall lack of concern, there is also a lack of fire statistics that can be used to help manage available resources to meet the fire problem. Currently, solutions are being developed to meet the problems of explosion relief in the handling of grains and fodder and in other dust-creating industries.

Furnaces fueled by straw are another fire problem in Denmark as they are being used widely for an economical source of heat. Information about the safe installation, arrangement, and operation of these straw-fired furnaces is being distributed. The problems caused in chimneys by the deposit left when these furnaces burn remain to be solved.

(Summarized from remarks made by Ernst Nielsen, Managing Director, Danish Fire Protection Association, Datavej, Denmark.)

France

A 1970 dance hall fire that killed 146 and a 1973 school fire that took the lives of 20 children resulted in some regulations for firesafety in France. However, fire is not a main cause of accidental death in France where about 250 deaths and 1,000 injuries occur annually from fire in a population of approximately 53,710,000 (1980). Fire claims 4 billion, 5 million francs (Mar. 1982: 6.24 francs=$1 US) in property losses annually in the industrial sector. Other structure fires result in property losses of 5 billion francs annually.

(Summarized from remarks made by Philippe de Moulins, Centre National de Prevention et de Protection, Paris, France.)

India

Since India achieved independence in 1950, the population shift from rural to urban areas has placed increased pressure on the public services in urban areas. Rapid industrialization and urbanization have increased the frequency and extent of fires and the losses from them. Direct losses from fire amount to about $1 million (US), while indirect losses amount to $9 million (US), less than 1 percent of the annual national income.

Fire, however, is recognized as a major concern. In 1978, the general insurance industry was nationalized and the Loss Prevention Association (LPA) was established to promote the philosophy and practice of loss prevention and the public's firesafety awareness. The LPA recognizes that motivation, awareness, and safety code enforcement are necessary to help prevent fires. In support of its fire prevention mission, the LPA collects data about fire in India; promotes the use of safety codes and firesafe practices; and provides a direct loss minimization service through its fire salvage corps. Since the fire service in India does not have the manpower to do salvage once the fire is out, the LPA organized a salvage corps in Bombay for this purpose and plans to organize corps in three other major cities in the future.

(Summarized from remarks made by S. P. Gupta, Managing Director, Loss Prevention Association of India Ltd., Bombay, India.)

Japan

Since World War II, fire protection in Japan has improved impressively. The fire service has changed from a chiefly volunteer organization to a professional one. The number of municipalities with full-time fire departments has grown from 218 in 1949 to 2,792 in 1980. The number of fire fighters grew to 117,000 during the same time period, or five times their number since 1949. The fire service is mainly involved in fire fighting, fire prevention, and first aid (emergency services).

Fire prevention has also significantly improved since the Fire Service Law of 1949 took effect. Fire prevention inspections, the regulation of hazardous materials, and the installation of fixed fire protection systems have improved and increased. The mandated installation of sprinklers in occupancies of a specified size has improved firesafety in industrial and other large facilities.

Although the fire service has been updated and upgraded, changes in Japanese living habits and the heightened threat of danger presented by the modern industrial environment produce increased problems for firesafety. Fire takes about 2,000 lives yearly and causes damages of about 150 billion yen. The change in the structure of cities and buildings as people and industry move to the city, the construction of complex high-rise buildings, and the existence of many underground shopping centers have weakened the cities' defense against fire. Both the types of structures and the materials used for their construction emit dangerous amounts of smoke and poisonous gases when they burn that can obstruct fire fighting, evacuation, and rescue efforts.

Modern lifestyles in Japan have led to a dramatic increase in the production, shipment, and use of gases in transportation, industry, and the home. The number of occupancies where hazardous materials are sold or used, such as filling stations, oil reserves, hospitals, and restaurants, has grown. Arson, nuclear power stations, the rapid increase in the number of cars, and the formation of towns close to petrochemical complexes further complicate the fire problem.

In Japan, no less than in any other modern industrial nation, the fire problem has grown in complexity and the potential for major disasters has increased. The fire service, however, is unprepared for the fire problems of the future. Although it is considered competent to fight ordinary building fires, it is not prepared for fires in high-rise structures and underground stores, nor for incidents involving oil, gas, and radioactive materials. In its 1980 report on the fire service, *White Book on Fire Service in Japan*, Japan's Fire Defense Agency called for "...all the institutions related to fire and disaster prevention, residents and offices to establish the disaster defense system for the whole community." This recommendation translates into:

1. strengthening fire defense capability through modernization and upgrading of facilities and equipment, and improved quality for the staff;
2. improvement of the voluntary disaster prevention program in communities, business, and industry;
3. the comprehensive and concerted promotion of a disaster defense administration to deal with the dangers presented by the use of diversified energy sources and improved living standards.

Nearly half of all building fires in Japan are residential. Thus, the chief focus of fire prevention is how to gain the support of the private citizen for fire prevention and how to promote voluntary fire prevention and protection activities. Women's fire prevention clubs (WFC) that are closely connected with municipal fire headquarters have been instrumental in the pursuit of the latter goal. These clubs are formed by housewives as private volunteer fire prevention organizations for learning and teaching fire prevention in rural and urban areas. As of May 1982, there were about 11,000 clubs with a total membership of about 1.63 million. The Japan Fire Protection Association holds an annual national convention and leader training to promote WFC activities.

The level of private fire protection in Japan also presents problems. Petroleum complexes and those facilities where hazardous materials are handled are required to have fire fighting systems. However, there are no established standards for fire fighting equipment and manpower. Neither are there standards for fire protection equipment and manpower in other structures such as high-rise buildings, underground shopping malls and streets, and large public buildings. The creation of minimum fire protection standards for such occupancies is therefore an urgent need.

(Summarized from remarks made by Masao Yo Koyama, Managing Director, Japan Fire Protection Association and from *White Book on Fire Service in Japan*, 1980, Japan Fire Protection Association, Tokyo, Japan.)

Korea

Rapid industrial development in Korea since 1960 has led to increased fire losses in life and property. In spite of this, there has not been any substantial improvement in fire protection and risk management. Help, however, is on the way.

In February 1973, the Korean government declared the Law on Indemnity for Fire Losses and Fire Insurance. In May 1973, ten non-life insurers in the areas of fire protection service and limited insurance joined together to form the Korean Fire Protection Association (KFPA). The principal goals of the Association are fire prevention, research, and programs aimed at reducing fire losses.

The KFPA conducts firesafety inspections in major cities on occupancies obligated to carry insurance and undergo safety inspections, i.e., buildings of four or more floors, government buildings, hospitals, restaurants, theaters, schools, industrial plants, department stores, and apartments. Inspection reports are forwarded to the appropriate government agencies. These agencies may require improvements as recommended. In such cases, KFPA extends loans to building owners who need to improve their fire protection systems in order to comply with government standards.

KFPA writes fire insurance for the types of occupancies listed earlier. The risks are wholly and equally shared with its member companies. In addition, KFPA donates fire fighting equipment to fire fighting agencies including fire fighting apparatus, communications devices, and inspection apparatus. Since 1973, these donations have amounted in value to $1.9 million (US). Lastly, KFPA publishes and distributes materials for the promotion and education of firesafety.

(Summarized from remarks made by Dai-yong Rhee, President, Korean Fire Protection Association, Seoul, Korea.)

South Africa

South Africa's major fire problem concerns the industrial sector where 100 million rand of 160 million rand (Mar. 1982: 1.05 rand=$1 US) in property loss from fire in 1981 was incurred. (These totals are only for fires aboveground and do not include mining fires.) Efforts are being directed at improving firesafety in industry. The National Standard Building Regulation is currently being prepared by the South African Bureau of Standards and will become mandatory for the nation when passed into law.

Another area where fire prevention efforts are directed is at the community level. Each municipality runs its own fire service; therefore, the level of expertise in fire protection varies throughout the country. Without any national direction, fire regulations are not consistently effective. Since fire brigades are funded by municipal taxes, they are restricted to extinguishing fires within their boundaries. In some cases, brigades have responded to a fire, only to discover it is outside of their district. In these cases, they have let the fire burn. Since mutual aid agreements are becoming more standard, this problem is becoming less frequent.

Reaching the public is another fire problem in South Africa. In 1979, there were more than 400 fire deaths reported, most in residential fires. But since there are two major languages spoken in the white community and 14 languages in the black community, it is extremely difficult to distribute and fund firesafety information. To further complicate the language problem, terminology for fire technology does not exist for the different language groups. So far, radio has been used successfully to get the firesafety message to the various ethnic groups who otherwise could not be reached.

(Summarized from remarks made by Peter R. Davey, Manager, Fire Protection Association of Southern Africa, Marshalltown, South Africa.)

Spain

The firesafety experience in Spain has been less than satisfactory until recently. In 1975, the Centro Nacional de Prevencion de Danos y Perdi — CEPREVEN — was founded with the purpose of promoting firesafety in Spain. Since it began functioning in 1976, the nonprofit association has contributed to assembling the forces of several fire protection interests in a combined effort to improve Spain's fire experience.

CEPREVEN's 280 members are mostly insurers. Funding comes chiefly from the member insurers and association activities. The Spanish government through research grants also contributes to CEPREVAN funding.

The Association achieves its mission to improve Spain's fire experience mainly by research, standards writing, and public education. Since its establishment, it has been involved in writing official firesafety standards for hotels, hospitals, public buildings, industry, and cities. In addition, it has helped write technical rules for portable fire extinguishers, fire hose systems, fire hydrants, automatic fire detectors, water supplies for fire suppression, and sprinklers. CEPREVAN provides technical consultation and research on fire prevention and protection upon request.

(Summarized from remarks made by Miguel A. Saldana, Director, Asociacion de Investigacion para la Seguridad de Vidas y Bienes, Madrid, Spain.)

Sweden

Fire killed 129 people in Sweden in 1980, continuing the ten-year trend there. In 1980, insurance payments totalled $260 million (US).

Fire suppression is the responsibility of the fire service. Approximately one-third of the fire service is full-time paid, while the other two-thirds are part-time. It usually takes four to eight fire fighters and two to three pieces of apparatus to contain a fire. The fire service is also responsible for rescue services, such as during landslides and flooding.

The Swedish Fire Protection Association (SFPA) was organized in 1919 by insurance companies to meet the need for information and to solve common fire protection problems. The nonprofit Association, with headquarters in Stockholm, draws members from four major groups: insurance companies, primary municipalities, industry, and 23 regional fire protection associations. The goal of the SFPA is to support and improve fire protection through information dissemination, education, publishing, and technical consultations. Three separate committees within the SFPA deal with farming, shipping, and electricity.

In 1979, the Swedish Fire Research Board was established to improve fire prevention and fire fighting. Its costs are shared equally by the government and private organizations.

(Summarized from remarks made by Kjell Gunnarson, Swedish Fire Protection Association, Stockholm, Sweden.)

Switzerland

The level of fire protection in Switzerland varies from canton to canton. The Swiss Confederation is made up of 26 cantons ranging in population size from 1,000,000 to 20,000 people. Each canton is fiercely independent to the degree that each has its own fire regulations and each ensures that its regulations differ in some way from those of the neighboring cantons. As can be expected in the larger cantons, fire protection is provided by specialists experienced in the field. In rural areas, however, experienced fire brigades and fire authorities are the exception rather than the rule, and the chief may often be a political appointee who has little knowledge about fire and its hazards. This situation is creating fire problems as industry moves from high rent urban areas to low rent rural areas, where levels of fire protection are less sophisticated and where water supplies for fire fighting are low or nonexistent.

(Summarized from remarks made by Dr. E. Bamert, Director, Brand-Verhutungs-Dienst fur Industrie and Gewerbe.)

United Kingdom

The economic recession of the last decade has taken its toll on firesafety in the United Kingdom. It has led to cutbacks in industry funding for safety such as fire brigades, equipment, and safety professionals. A dominant feature of British fire losses has been the high incidence of large-loss (million pound) fires, especially in storage and warehouse facilities.

The recession, though, has also led to a more exact identification of fire problems and more cost-effective ways to deal with them. For example, over the next few years, the Fire Precautions Act for Existing Buildings, with its very complicated certification procedures, will be replaced with a more logical, sensible, and economical approach to firesafety that deals with identified fire problems. This means that a better targeting of fire problems will be necessary if money is to be used wisely. For example, today life safety requirements are demanding in business and industry where the fewest lives are lost to fire, yet there are no requirements for fire protection in homes, where the most deaths occur. Neither is there any special provision for firesafety for the elderly. Therefore, future legislation will need to be targeted to reduce the fire risk to elderly people in their homes. In addition, the regulations for firesafety in industry and business will need to be targeted to high risk areas, rather than treat every situation evenly as is now the case.

While the Fire Protection Association (FPA), the government, and fire brigades have dealt successfully with the technical problem of fire, arson tends to negate any significant gains. Over the last 10 to 20 years, there has been a tremendous increase in the incidence of arson. This has not been arson-for-profit as much as acts of vandalism. At least 15 percent of all fires in the United Kingdom are started deliberately, and one-third of all large-loss fires are started deliberately. In other words, nearly 50 percent of all major fires are started deliberately.

There is much apathy in the public sector about the protection of property from fire. This attitude presents a real challenge to the general public since schools and community buildings are especially vulnerable to fire.

To promote improvement in these problem areas, the FPA has begun a program to combat arson, has encouraged improved structural safety and automatic fire protection for storage and warehouse facilities, and has increased FPA training facilities.

(Summarized from remarks made by C. Douglas Woodward, Director, Fire Protection Association, London, England.)

International Fire Protection Associations

Many countries have associations dedicated to reducing loss of life and property from fire. Those listed here function broadly in their objectives, but are financed and structured in various ways. Some of the associations are supported by the insurance industry, some partially by government sources, and some are independent.

Very few of the international associations listed here develop codes and standards as is done in the United States by the National Fire Protection Association (see the section on standards). In addition to these associations, there are specialized groups in many countries that serve industry, the fire service, and the general public.

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if a name, an address, or a phone number has changed; if there's an upcoming event, a new program or course, a new publication being offered. If you have more current information than is contained in this *Almanac*, know something that should be included in this book, or just have something interesting about the fire protection scene that you want to contribute, please let us know. Write: Editor, *Fire Almanac*, NFPA, Batterymarch Park, Quincy, MA 02269. All suggestions will receive our careful attention.

Legends and Lore

Fire Through the Ages

Since man discovered fire, it has been at once a source of comfort and a source of disaster. Fire has been used to further man's most noble ambitions, yet has been abused to further his most sinister motives. But whether as friend or foe, fire has had an interesting history which is presented here in a timeline format to highlight events involving fire through the ages.

BC

400,000-200,000	Evidence uncovered in China in the 1920s shows that Peking man used fire.
7000	Neolithic agriculturists from the Near East used fire to clear fields and produce ash to use as fertilizer — called the "slash and burn" technique.
1400	Ancient city of Knossos destroyed by fire.
200	Ctesbius of Alexandria invented primitive fire engine. Used by the Greeks and later by the Romans, it was then abandoned for many years.
146	North African city of Carthage burned to ashes by the Romans — 50,000 people slain.

AD

1 AD	Romans organized fire fighters into "Corps of Vigiles."
64	Rome, Italy burned for 8 days. Ten out of 14 wards of city were destroyed.
871-901	Alfred the Great of England initiated first fire prevention laws by ordering people to cover cooking fires at night.
1000	William the Conquerer strengthened existing fire prevention laws.
1600-1700s	Fire used as a weapon during wars.
1608	Jamestown, VA fire destroyed colonists' lodging and provisions just one year after settlement.
1613	Dutch trading ship, *Tiger*, burned in NY Harbor.
1623	Plimouth, MA suffered fire that destroyed provisions and dwellings.
1628	Manhattan dwelling fire resulted in first fire prevention activities for Nieuw Amsterdam (NY). First fire prevention building code went into effect along with mandatory chimney inspection and municipal fire protection.
1631	Boston suffered its first fire; two dwellings burned.
1638	Maryland passed first law making arson a felony.
1648	Peter Stuyvesant organized first volunteer firemen in America and passed fire prevention/protection laws. These laws provided fire wardens for inspection and a "Rattle Watch" to notify residents of fire.
1649	Private Boston citizen developed well on his property.
1652	Boston families received fresh water supplies especially for use in fires. Arson legislation passed.

1653	Boston suffered first major conflagration and 3 children were first recorded US fire deaths. Aftermath of conflagration gave Boston its first fire regulations to prevent fire.
1658	Massachusetts law passed to compensate owners of buildings destroyed by fire.
	Colony of Nieuw Amsterdam received fire fighting apparatus from Burgomaster of Dutch NY: buckets, fire hooks, ladders — this was the first municipal fire fighting system.
1666	Great Fire of London burned for 4 days and left 100,000 persons homeless.
	Dr. Nicholas Barton invented idea of fire insurance. The company later became known as Phoenix Fire Insurance Co.
	Development and improvement of Van der Heijden fire engine. The first engine was called the hand tub or water engine.
1676	Boston fire destroyed dwellings, warehouses, stores and North Meeting House. First use of explosives to hinder fire spread. Boston citizens take oath of allegiance to help stop secret attempts to start fires.
1678	First hand tub imported from England.
1679	Arson fire destroys a major portion of the built-up center of Boston. Gunpowder storage an added hazard in this fire.
1696	Bucket brigades in operation in America.
1700	Settlement of Charleston, SC practically wiped out by fire.
1716	Early fire plugs ordered in use by English Parliament. This early method lasted more than 20 years.
1717	Bostonians organized themselves into unpaid volunteer fire department. First fire department in American colonies.
1718	First fire engine brought over to America from England.
1720	Mutual Fire Society organized to cover 5 districts in Boston.
1721	Richard Newsham invented effective fire engine in England — water could rise up to 165 feet.
1730s	"Gooseneck" fire engines first designed in the colonies.
1736	Benjamin Franklin organized the Union Fire Company, the first fire brigade in Philadelphia, PA.
1740	Charleston, SC had its second great fire.
1752	First American insurance company established — Philadelphia Contributorship.
1754	Providence, RI passed a law requiring each household to have a 2-gallon fire bucket.
1759	Savannah, GA purchased a hand engine and townsmen organized a fire company.
1763	Engine men, called Fire Wards, appointed in Providence, RI.
1764	Baltimore, MD founded fire company.
	Ben Franklin founded a fire company in Philadelphia.
1772	Antoine Lavoisier, French chemist, reasoned that rather than releasing something into the air, burning material was absorbing some element from the air.
1774	English chemist, Joseph Priestly, discovered oxygen. He reasoned that oxygen was present in the air and being absorbed by burning materials when the object was burned.
1775-1776	Fire used as a weapon in the American Revolution. Alarm bells melted to make cannonballs so there was little warning of fire. Major conflagrations caused by the British were Falmouth, ME; Bunker Hill, MA; and New York City, NY.
1778	Charleston suffered another conflagration losing 250 dwellings, stores, and warehouses.
1779	After still another Charleston conflagration, the hand-in-hand company was formed which consisted of passing buckets from water cart to the fire.
1784	Mutual Assurance Company organized.

1787	Richmond, VA conflagration — fire fighting company organized.
1788	New Orleans destroyed by a fire caused when a curtain blew over an open candle.
1791	First double-deck/end stroke hand engine built in Philadelphia.
1792	Insurance Company of North America was formed.
1797	Newark, NJ organized a fire company and purchased small hand engine.
1798	General Assembly of KY enacted law to form 5 fire engine companies in Louisville — manned by volunteer fire brigades.
1800	John Carey, English inventor, invented first crude automatic sprinkler but it went undeveloped for a long period.
1801	Fire in the Treasury Dept. in Washington, DC led to the establishment of Washington into wards with fire companies.
1803	Cincinnati, OH volunteer fire department established. Wooden hydrants installed in Philadelphia.
1806	In the aftermath of a major fire in Philadelphia, hydrant inspections began.
1807	Early fire prevention activity in Washington, DC resulted in all chimneys being cleaned.
1808	Cincinnati OH Fire Bucket Co. formed.
	A new concept in fire fighting developed with use of leather fire hoses seamed by copper rivets.
	NYC got first working hydrant attached to underground water main.
1811	St. Louis, MO formed first fire department.
	Philadelphia diverted water from storage trunks in the street for use in fire fighting.
	Philadelphia Hose Co. formed.
1812	War of 1812 brought major conflagrations: Capitol Building, State and War Department, Treasury Building, Government Arsenal.
	Increased use of fire rafts (fire ships) to threaten enemy.
1816	Richmond, VA organized the Richmond Fire Society for the purpose of rendering mutual aid.
1817	"Real" hydrant built by George B. Smith of NYC, but was not very effective.
1819	Philadelphia organized a special fire patrol to perform salvage work.
1821	St. Louis, MO organized volunteer fire company.
1827	English chemist John Walter invented the friction match containing phosphorous sulfate.
1829	George Braithwaite built first fire engine using steam to pump water.
1830	Fire protection improvements in Richmond, VA brought a water supply system, reservoir, water pump hose and private hydrants.
1832	Horses began pulling engines after Asiatic cholera plague struck firemen.
	Sectional ladders used as first fire escapes by John Braidwood of London.
1835	NYC conflagration brought $20-40 million property loss. Following the fire, private patrols were appointed to cover the city in event of second outbreak.
1837	Milwaukee, WI formed its first volunteer fire company.
1840	Henry R. Worthington invented an independent, direct-acting steam power pump. P.R. Hodge built steam engine.
1841	NYC attempted to use steam fire engines but was scorned by volunteers.
1845	William F. Channing of Boston invented the fire alarm telegraph.
1846	Alfred Moore, English engineer, invented the ball hydrant.
1849	San Francisco, CA conflagration caused by arson.
	St. Louis, MO conflagration began on the ship "*White Cloud*."
	Philadelphia, PA fire caused by gunpowder explosion (57 lives lost).
	San Francisco, CA fire causes $12 million in property damage. Due to a large number of arson attempts, San Francisco organized vigilante groups to patrol city and watch for arson attempts.

1852	William F. Channing installed central office and 45 street alarm boxes in Boston. Patent issued for first sprinkler-perforated pipe system — the first recognized installation of fire protection equipment.
1853	Cincinnati was the first American city to replace volunteers with the horse-drawn steam fire engine, and to form a paid fire department.
1854	Jennings Building fire causes 4 deaths in NYC.
1857	St. Louis, MO had fully paid steam fire department. Philadelphia ferryboat *New Jersey* fire (67 deaths).
1858	Crystal Palace fire, NYC.
1859	Baltimore, MD established its first paid fire department.
1860	As a result of a NYC tenement building fire where 20 people died, the Common Council passed an ordinance requiring fireproof stairs or fire escapes. Cincinnati installed its first fire alarm telegraph.
1861	Milwaukee, WI establishes first paid fire company.
1861-1865	Civil War began and much arson occurred: Lord's Theater, Washington, DC; President Lincoln's private stable; US Government Arsenal, Washington, DC; Washington, DC fire; Savannah, GA fire; Richmond, VA fire.
1861	Washington, DC fire department became fully paid organization and installed fire alarm telegraph.
1863	NY draft riots occur. NYC becomes paid fire department. San Francisco, CA used horsedrawn apparatus.
1864	Stewart Harrison, English inventor, produced the automatic sprinkler.
1866	Portland, ME conflagration.
1870	Philadelphia, PA gets paid fire department. Daniel Hayes invents first aerial ladder truck raised by a hand crank. Invention of first hose elevator.
1871	Los Angeles, CA organized first volunteer unit. Philadelphia, PA fire marks are discontinued. 250-300 lives lost in the Great Chicago Fire. 800 lives and all buildings but one destroyed in Peshtigo, WS. Standardization of fire fighting equipment. Rubber-lined, cotton-jacketed fire hose replaced the riveted leather hose in Philadelphia.
1872	Great Fire of Boston destroyed a square mile of the business district. As a result of the Great Fire of Boston, more than 70 insurance companies went bankrupt. Those companies that survived formed the National Board of Underwriters to set up safeguarding rules for insurance companies to follow. New building laws pass country-wide.
1873	Suspended harness invented by firemen in St. Joseph, MO. First sliding poles (of wood) installed in some NY fire departments. Quick-hitch collar and harness invented by Cambridge, MA fireman Charles Berry.
1874	Automatic sprinklers introduced.
1876	Brooklyn Theater Fire.
1880	Frederick Grinnell improved upon the automatic sprinkler. Insurance companies cut rates to businesses installing Grinnell sprinklers.
1884	Sioux Falls, SD bought large bell and mounted it on a tower for fire warning.
1888	Fire in the state penitentiary in Richmond, VA.
1889	Seattle, WA fire. Spokane, WA fire. Boston, MA conflagration.

1894 Underwriters Laboratories established to develop tests to measure fire resistance of various materials.

1896 National Fire Protection Association established by a group of men uniting to draw up a standardized approach to sprinklers.

1900 North German Lloyd Steamship fire in Hoboken, NJ claimed 326 lives. Waterfront fires became a major concern.

1903 Rhodes Opera House fire, Boyertown, PA (170 deaths).

Iroquois Theater fire, Chicago, IL (602 deaths and 250 injuries).

1904 Successful breathing apparatus invented but not adopted for a number of years.

General Slocum, an excursion steamer with combustibles on board, had a fire and 1,030 lives were lost. This fire lead to inspection of ships in NY Harbor.

Baltimore, MD conflagration raised national attention for the need for standardized fire hose couplings and screw threads.

1905 Fire in Grover & Company shoe factory, Brockton, MA (50 deaths).

1906 Worst conflagration in American history thus far occurred when earthquake/fires hit San Francisco, CA — 492 deaths and $350 million property damage.

1907 Gasoline-powered motors and pumps begin to appear in the fire service.

Underwriters Laboratories initiated its factory inspection service and began to issue labels for "approved devices."

Invention of first pumper with a single engine to do both driving and pumping.

1908 Fire at Lakeview Grammar School, Collinwood, OH (175 deaths).

Chelsea, MA conflagration burned 3,500 buildings and took 18 lives.

1909 Theater fire, Acapulco, Mexico (250 deaths).

Regular inspections in Cincinnati, OH reduced the number of fire alarms.

1910 Fire in the Nelson Morris Co, Chicago, IL — 21 firemen killed by falling wall.

NYC fire — Grand Central terminal yard.

Transport of hazardous materials quickly becoming a great hazard to man.

1911 Triangle Shirtwaist Factory fire, NYC (150 deaths).

NYC created Committee on Safety which led directly to Safety to Life Committee of NFPA.

NY organized Bureau of Fire Prevention and established its fire college.

1912 Equitable Building fire in NYC, NY.

1913 *Life Safety Code*® established.

Binghamton Clothing Factory fire results in new standard for building exits (35 deaths).

Single-driving and pumping engine developed to efficiency.

1916 Fire at Paris, TX — spread by wooden shingle roofs.

Black Tom Pier fire and explosion in NJ.

1917 First Building Exits Code developed.

Ammunition storage explosion, Halifax, N.S. (1,500 deaths).

Eddystone Ammunition Corporation explosion, Eddystone, PA (133 deaths).

Collision of *SS Mont Blanc* and *SS Imo*, Halifax, N.S. (1,800 deaths).

1918 International Association of Firefighters Union organized.

Fire at Oklahoma State Hospital for Insane, Norman, OK (38 deaths).

Hydroplanes used in San Diego, CA for waterfront fires.

Grey Nunnery fire in Montreal, Canada resulted in the deaths of 33 babies.

Forest fires, MN (559 deaths).

Smoking restricted in NY State factories.

1919 Dance hall fire in Ville Platte, LA (25 deaths).

Establishment of Swedish Fire Protection Association.

Two-platoon system begins in NYC — many cities had already adopted shorter hours for firemen.

1921	*National Electrical Code®* established. California passed a bill forbidding wooden shingles on roofs; pressure from industry brought a repeal. San Lazaro, Manila conflagration.
1922	Last horse-drawn engine in NYC retired. President Harding issued first Fire Prevention Week proclamation — all other Presidents followed tradition. Standards for Municipal Fire Alarm systems adopted. Aalborg, Denmark conflagration.
1923	Cleveland School Fire in Beulah, SC (77 deaths). Tokyo and Yokohama earthquake and conflagration, Japan (91,344 deaths). Manhattan State Hospital fire (27 deaths). Fire at Illinois State Hospital, Dunning, IL (18 deaths). US Chamber of Commerce sponsors National Fire Waste Council with contest for fire prevention in cities by local chamber of commerce. Fire prevention education in schools required by 13 states. American Petroleum Institute organized a Fire Prevention Committee (still active today).
1924	Babbswitch, OK schoolhouse fire (32 deaths, 37 injuries).
1925	Kevin Hall fire in Glasgow, Scotland.
1926	Roofing materials tested in Canada by the Dominion Fire Prevention Association. Mexico City, Mexico movie picture theater fire. Shakespeare Memorial Theater fire, Stratford-on-Avon. Movie picture theater fire, Drumcollogher, Ireland (50 deaths).
1927	Annual Fire Prevention Week inaugurated. Hospice St. Charles fire, Quebec, Canada. Motion picture theater fire in Tammerfers, Finland (21 deaths).
1928	Theater fire in Madrid, Spain started by short circuit (68 deaths). Fire in Fall River, MA burns 107 factories and business blocks. Aviation fires beginning to receive serious attention.
1929	Cleveland Clinic fire results in poisonous fumes from burning X-ray films (125 deaths). Glen Motion Picture Theater Fire, Paisley, Scotland — 70 children die and 37 injured due to panic and trampling. Perfumery store fire, Venice, Italy. Stock market crash had devastating effect on fire department budgets. Loss of manpower and stations resulted; incendiary fires increased. Fires in the White House and the Capitol, Washington, DC, drew attention to the need for better protection of federal properties.
1930	Ohio State Penitentiary fire, Columbus, OH (320 deaths). NFPA Aviation Committee recommends good practice requirements for fire-safety and life safety in aviation. Sunday Creek Oil Co. coal mine gas explosion, Millfield, OH (83 deaths). Norwegian Royal Residence fire, Oslo, Norway.
1931	Dwelling inspections carried out by fire departments in Providence, RI and Arlington, MA. New Zealand earthquake and fire (250 deaths). Managua, Nicaragua earthquake and conflagration (1,000 deaths).
1932	Burlington Railroad fire, Chicago, IL. Pulpwood fire, Port Alfred, Quebec. Tokyo Department Store fire, Tokyo, Japan. Reichstag fire, Germany.

1930-1933 Comprehensive fire loss study estimates that most fire deaths involving the very old and the very young occur in ordinary dwellings.

1934 *S.S. Morro Castle* fire off the NJ coast (125 deaths).

Conflagration in Hakodate, Japan destroys one-half of the city and takes 2,018 lives.

1936 Fire in Pruitt Hardware Company, Gainesville, GA following tornado (57 deaths).

1937 Consolidated School fire in New London, TX gas explosion (294 deaths). This fire focused attention on the need to safeguard buildings not subject to municipal ordinances.

German zeppelin *Hindenburg* burned as a result of an engine spark igniting flammable hydrogen (36 deaths).

1938 Fireworks accidents numbering 1,702 in one year lead Pennsylvania to adopt fireworks law.

Changsha, China conflagration (2,000 deaths).

Attic Photographic Studio fire, Oslo, Norway.

Sacred Heart College, St. Hyacinthe, Quebec coal gas explosion (46 deaths).

1939 Chicago, IL dust explosion fire.

Incendiary bombs dropped on European cities.

Insane Asylum fire, Gifford, Quebec.

Queen Hotel fire, Halifax, N.S. (28 deaths).

Steamship *Paris* fire, LeHavre, France caused by oven fires left burning in ship's bakery.

Munitions factory, Hirakata, Japan (200 deaths).

1940 Fire storms in cities all over the world.

Rhythm Club dance hall fire, Natchez, MS (207 deaths).

Newsprint paper fire, Addington, New Zealand.

Colon, Panama conflagration.

1941-1945 Bombing of Pearl Harbor resulted in loss of 2,383 lives and 19 American ships. Other losses - $25 million damage to aircraft, $25 million damage to buildings, supplies and ammunitions, 88 ships damaged and 960 persons missing.

Pearl Harbor experience led to fire training program of the US Navy.

Japanese and European cities destroyed by war conflagrations.

Firestone Tire and Latex Co., Fall River, MA fire.

1942 *Normandie/US Lafayette* fire resulting from a spark from a welding torch igniting life preservers.

Cocoanut Grove Night Club fire, Boston, MA (492 deaths). This fire showed the need for practical improvements. UL stepped up research on combustibles in public places.

Blood plasma used in treatment of burns.

Recreation hotel fire, St. John's, Newfoundland (99 deaths).

1943 Gas rationing presents new hazard of gas storage.

Use of space heaters and makeshift heating devices poses new hazards.

"Rain of Terror," Hamburg, Germany. Fire storms killed 60,000 - 100,000 people.

1944 Ringling Bros. and Barnum and Bailey Circus Tent fires Hartford, CT (162 deaths and 200 injuries).

Ammunition ship exploded Bombay, India (700 deaths).

U.S.S. Mount Hood, ammunition ship, at anchor in Seeadler Harbor, Manus Island, Admiralty Islands — explosion of ammunition (373 deaths).

East Ohio Gas Co. fire, gas explosion, Cleveland, OH (130 deaths).

Munitions Depot explosion, Port Chicago, CA (300 deaths).

1945 Dresden, Germany, explosive incendiary bomb raid (300,000 deaths).

Eastern Air Lines DC-3 near Florence, S.C., fire in flight (22 deaths).

Empire State Building struck by aircraft (14 deaths).

1946	LaSalle Hotel fire, Chicago, IL (61 deaths).
	Hotel Canfield, Dubuque, IA (19 deaths).
	Winecoff Hotel fire, Atlanta, GA (119 deaths).
1947	*The Markay* — petroleum tanker fire in Los Angeles, CA. Fireboats used to fight miles of waterfront fire.
	Grandcamp fire, Texas City, TX, ammonium nitrate explosion (400 deaths).
	Centralia Coal Co., Centralia, IL dust explosion (111 deaths).
	England Fire Protection Association established.
	Ammunition depot fire, Cadiz, Spain (300 deaths).
	Department store fire, Christchurch, New Zealand (41 deaths).
1948	DC4 accident at Chicago Municipal Airport (12 deaths). This fire recognized the need for specialized aircraft rescue and fire fighting vehicles for airports.
	Earthquake/conflagration at Fulcui, Japan (3,000 deaths).
	3-cent stamp honors volunteer firemen.
1949	St. Anthony's Hospital fire, Effingham, IL (74 deaths).
	Holland Tunnel fire, NY — truck loaded with 48,000 lbs. of carbon disulphide.
	S.S. Noronic ship fire, Toronto (124 deaths).
	Chungking, China conflagration (2,513 deaths).
	Pictorial training manual published by International Association of Fire Chiefs and Fire Department Instructors.
1950	Mercy Hospital fire, Davenport, IA (41 deaths).
	Epidemic of nursing home fires.
1951	Lansing, MI State Office Building suffers $5 million fire — irreplaceable records and plans lost.
	Sparky the Fire Dog created as a symbol of fire prevention for children.
	Project East River.
	C. W. & F. Coal Co., W. Frankfurt, IL gas explosion (119 deaths).
1953	Society of Fire Protection Engineers received charter in Chicago, IL.
	General Motors Corporation fire, Livonia, MI.
	Torch sweater fires lead to Flammable Fabrics Act.
1954	Cleveland Hill School fire, Cheektowaga, NY (15 deaths).
	Oil refinery fire in Whiting, IN resulted in $16 million loss — explosion and boilover.
	Church-Wiley bill prohibits shipment of fireworks into any state where fireworks prohibited by state law.
	USS Bennington explosion en route to Narragansett Bay, RI (106 deaths).
	Junior Fire Department in Los Angeles, CA organized.
1955	Barton Hotel, Chicago, IL (29 deaths).
1956	Spheroid tank rupture kills 19 and injuries 32 at Shamrock Oil and Gas Corp, Texas.
1958	Our Lady of Angels School, Chicago, IL — rubbish fire spread through open stairway (95 deaths).
	Amateur rocketry poses new hazards.
	Vida department store fire, Bogota, Colombia (83 deaths).
	Business district fire, Lanark, Ontario.
	Bermudiana Hotel fire, Hamilton, Bermuda.
1959	Stalheim Hotel fire, Stalheim, Norway caused by smoking in bed (26 deaths).
	Conflagration, Vastervik, Sweden.
	Prison barracks fire, Koulion, Finland.
	Haderslev Park Lake fire, Sutland, Denmark — excursion boat burned by ignition of gasoline on motor.
1960	Matson Navigation Co. fire, Los Angeles, CA caused by a welder's torch. Scuba firemen used for first time.
	Fire in bonded whiskey warehouse in Glasgow, Scotland took lives of 9 firemen.

Guatemala mental hospital fire (170 deaths).

Movie house fire in Syria (163 deaths).

Brooklyn, NY, fire on aircraft carrier, *USS Constellation*, nearing completion (50 deaths).

Australian Fire Protection Association established.

1961 Hartford Hospital fire, Hartford, CT (16 deaths).

Brazil circus tent fire (400 deaths).

1962 Coal mine explosion, Saarbucken, Germany (290 deaths).

Nursing home fire in Fitchville, OK (63 deaths).

Department store fire in Tokyo, Japan (7 deaths).

1963 Fire in 14-story hotel in Jacksonville, FL (21 deaths).

Indiana State Fairgrounds Coliseum, Indianapolis, IN (74 deaths).

Golden Age Nursing Home, Fitchville Township, OH (63 deaths).

Roosevelt Hotel, Jacksonville, FL (22 deaths).

Surfside Hotel, Atlantic City, NJ (25 deaths).

Denpassau, Bali earthquake and conflagration (1,000 deaths).

1965 Louisville, KY industrial plant fire (12 deaths). For the first time fire fighters were attacked and harassed.

Multiple fires resulting from Watts riots in Los Angeles, CA. After 34 lives were lost, special gear was used to protect fire fighters as a defense.

Passenger train fire near Zaragoza, Spain — wooden coaches (26 deaths).

U.S. Navy Communications Center fire, Kamiseya, Japan.

1966 Fire department strikes in Atlanta, St. Louis, and Kansas City. The IAFF did not sanction the strike.

1967 McCormick Place fire, Chicago, IL (1 death).

Apollo Space Capsule fire, Cape Kennedy, FL — 3 astronauts died. A fire resistive fabric, Nomex,® came into existence.

Brush fires in Tasmania (62 deaths).

Cornell University, NY fire claims 9 lives.

Department store fire, Brussels, Belgium (325 deaths).

Berrydale, FL prison fire — a result of rioting (38 deaths).

Forrestal aircraft carrier fire off coast of Vietnam (131 deaths).

Dale's Penthouse restaurant fire, Montgomery, AL (25 deaths).

Coal mine explosion, Turon, Spain — methane gas exploded when ignited by lamp flame (11 deaths).

1968 "No strike clause" deleted from International Association of Fire Fighters constitution.

Marting Arms fire (sporting goods store), Richmond, IN — gunpowder explosion (41 lives).

Mental hospital fire, Shrewsbury, England (24 deaths).

1969 Hawthorne house apartment building fire, Chicago, IL (4 deaths).

Apartment house fire, Kansas City, MO — dumbwaiter shaft spread fire throughout building (12 deaths).

Aircraft carrier fire — 75 miles south of Pearl Harbor.

Atomic Energy Commission Plant fire, Golden, CO.

Princess Lalla Hasmaa Home for Children fire, Casablanca, Morocco — 6 babies died.

Home for the Aged fire, Notre Dame du Lac, Quebec (40 deaths).

1970 Pioneer Hotel fire, Tucson, AZ (28 deaths).

Convalescent home fire, Marietta, OH (32 deaths).

Two New York City fires resulted in NYC establishing a comprehensive fire prevention code for high-rise buildings.

Ozark Hotel fire, Seattle, WA (20 deaths).

Dance hall fire in Grenoble, France (146 deaths).

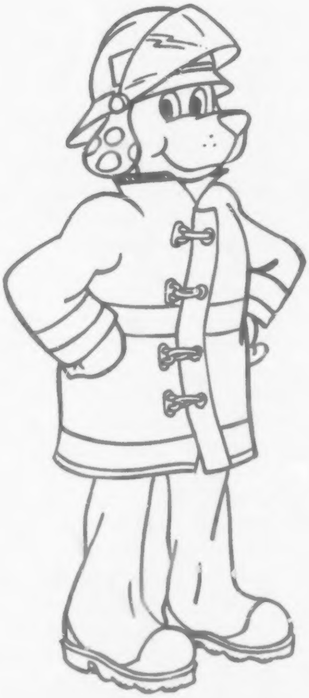
Ponet Square Hotel fire, Los Angeles, CA (19 deaths).

1971 Equipment plant fire, Pas de Calais, France.
Chemical plant fire, Woodbine, GA — violent explosion and fire (25 deaths).
Hotel fire, Seoul, Korea (163 deaths).
Nursing Home fire, Beuchel, KY (10 deaths).
Floating restaurant fire, Hong Kong (34 deaths).
Nursing home fire, Honesdale, PA (15 deaths).
1972 Andraus Building high-rise fire, Sao Paulo, Brazil (16 deaths).
Careless match disposal causes fire in multi-occupancy building in Osaka, Japan. Heat and toxic gases caused 118 deaths.
Silver Mine fire, Kellogg, ID — toxic gases through ventilation system, inadequate breathing aids (91 deaths).
Coldharbor Mental Hospital fire, Shelborne, England (30 deaths).
Wagon Wheel night club fire, Montreal, Quebec — incendiary origin (37 deaths).
1973 Kingman, AZ fire — rail tank car (13 deaths).
Apartment house fire, Los Angeles, CA (25 deaths).
Summerland Leisure Center fire, Isle of Man (50 deaths).
Avianca Building, Bogota, Colombia fire (4 deaths).
Aircraft crash, Boston, MA — instrument landing in fog (46 deaths).
Department store fire, Kumamato, Japan (103 deaths).
Gas storage tank fire, Staten Island, NY — polyurethane insulation (40 deaths).
Caixa Economica Building fire, Rio de Janeiro, Brazil.
1974 Hotel fire in Seoul, Korea.
Discotheque fire, Port Chester, NY — incendiary fire in adjacent occupancy (34 deaths).
Joelma Building fire, Sao Paulo, Brazil.
1975 LP-Gas transport truck explosion in Eagle Pass, TX (19 deaths).
Jail fire, Sanford, FL (11 deaths).
B727 plane crash and fire, NY; spilled fuel ignited after crash (113 deaths).
1976 Social Club fire, Bronx, NY (25 deaths).
Nursing home fire, Chicago, IL (24 deaths).
Pathfinder Hotel fire, Fremont, NE — natural gas explosion (20 deaths).
1977 Dormitory fire, Providence, RI (10 deaths).
Stratford Hotel fire, Breckenridge, MN (16 deaths).
Supper Club fire, Southgate, KY (165 deaths).
Saint John City Detention Center fire, Saint John, New Brunswick (2 deaths).
County Jail fire, Columbia, TN — incendiary origin (42 deaths).
Filipinas Hotel fire, Philippines (47 deaths).
1978 Train derailment fire, Waverly, TX — LP-Gas tank car BLEVEd.
Institution for Mentally Retarded fire, Ellsville, MS (15 deaths).
Contes House Hotel fire, Kansas City, MO (20 deaths).
LP-Gas tank truck fire, near Mexico City, Mexico (12 deaths).
1979 Boarding home fire, Farmington, MO (25 deaths).
Woolworth's Department Store fire, Manchester, England.
Halfway house fire, Washington, DC (10 deaths).
Houston, TX Conflagration.
County Jail fire, Lancaster, SC (11 deaths).
Ohio boarding home fire, Pioneer, OH (14 deaths).
1980 MGM Hotel fire, Las Vegas, NV (85 deaths).
Boarding home fire, Bradley Beach, NJ (24 deaths).
Stouffer's Inn hotel fire, Harrison, NY (26 deaths).
Opemiska Social Club fire, Chapais, Quebec (48 deaths).
1981 Group live-in facility fire, Keansburg, NJ (31 deaths).
Group live-in facility fire, Point Pleasant Beach, NJ (7 deaths).
Hilton Hotel fire, Las Vegas, NV (8 deaths).

Adult foster care home fire, Detroit, MI
Lynn, MA conflagration.
Royal Beach Hotel fire, Chicago, IL (19 deaths).
1982 Hotel New Japan fire , Tokyo, Japan (32 deaths).
Westchase Hilton fire, Houston, TX (12 deaths).
Conrad Hilton Hotel fire, Chicago, IL (4 deaths).
K-Mart Warehouse fire, Bucks County, PA
Dorothy Mae Apartment Hotel fire, Los Angeles, CA (24 deaths).
Perry's boarding home fire, Pittsburgh, PA (5 deaths).
Harrison County Jail fire, Biloxi, MS (29 deaths).
Oil storage tank fire, Tocoa, Venezuela (at least 67 deaths).
1983 Gasoline storage tank explosion and fire, Newark, NJ (1 death).
Silver Leaves group home fire, Eau Claire, WI (6 deaths).
Halfway house fire, Worcester, MA (7 deaths).
Air Canada DC-9 fire, Cincinnati OH (23 deaths).
Ramada Inn fire, Fort Worth, TX (5 deaths).
Bush fires, South Australia and Victoria states, Australia (74 deaths).

Fire Service Traditions

Sparky the Fire Dog



Sparky the Fire Dog, the friendly-looking character with a dalmatian's face, dressed in fire fighter's turnout gear from helmet to boots, is synonymous with firesafety to millions of American school children and their families.

Sparky was "born" in 1954 to carry the public firesafety messages of the National Fire Protection Association (NFPA). Since then, he has acquired a loyal following throughout the United States and Canada, in factories, on military bases and at government facilities as well as in the classroom. He has become the symbol of firesafe practices everywhere.

In his early years, Sparky looked mainly like a dalmatian, complete with whiskers and a long tail, wearing firemen's jeans. Through the years, with the help of some professional recognition factor studies, Sparky has evolved to today's figure: still friendly-looking, but with a no-nonsense stance. He wears the recommended type of helmet with a facepiece for added safety, and a turnout coat, trousers and boots for maximum protection in a fire.

The choice of a dalmatian as the basis for Sparky was an obvious one, as was the Sparky name. Dalmatians have shared the barns and the hunt courses with horses for centuries. Look closely at any good English hunt print and you'll see dalmatians racing across the fields along with the hunters on horseback.

When fire apparatus was horse-drawn, nearly every firehouse had its resident dalmatian to help direct the horses, keep the horses company, and guard the firehouse. Some dalmatians stayed behind when the apparatus was rushed to a fire; others rode on the fire truck and were as much a part of the fire scene as were the fire fighters themselves.

Firehouse dogs nearly always were called "Sparky," so "Sparky" was the obvious name for NFPA's fire prevention symbol.

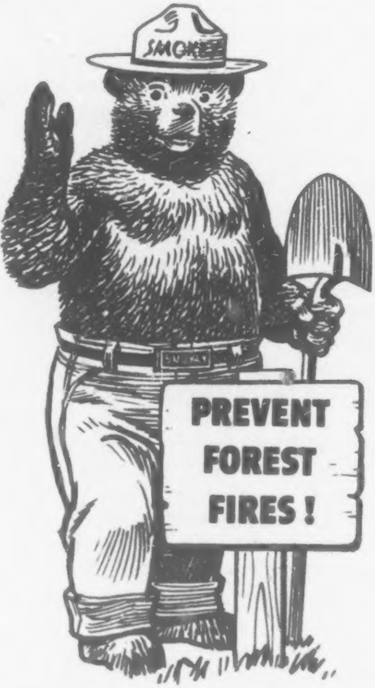
Motor apparatus long ago replaced horse-drawn fire engines, but dalmatians — many called "Sparky" — still are found in fire stations throughout the United States. As in the days of old, many enjoy riding the engine to the fire scene, while others stay to guard the firehouse until the fire fighters return.

Smokey Bear Celebrates 40 Years of Fighting Forest Fires

(Source: Forest Service, U. S. Department of Agriculture)

A Forest Fire Preventing Bear

The first Smokey Bear poster was created in 1944 by the Forest Service and the Ad Council for use in creating an awareness of the need for fire prevention. The artist gave the bear a short nose, an appealing face, and put him on his hind legs. The bear wore a campaign hat and blue jeans. The Forest Service named the bear 'Smokey' and he has been on forest fire prevention posters for 40 years. Many activities have been planned during 1984 to celebrate Smokey Bear's 40th Birthday and his forest fire prevention message.



One day in 1950, someone was careless with a match, cigarette, or campfire in the Lincoln National Forest in New Mexico. One second of carelessness started a terrible forest fire and hundreds of fire fighters battled the flames. When a strong wind suddenly swept the fire toward the fire fighters, twenty-four fire fighters nearly lost their lives. They ran to a rock slide and lay face down with their faces covered with wet handkerchiefs. The fire raged all around them and the smoke choked them.

Finally the fire passed and the smoke cleared. The only living thing those twenty-four brave fire fighters saw was a badly burned bear cub clinging to a blackened tree. They took the little bear to a ranger station where many people tended to the burns.

After the burns healed, the little bear was sent to live at the National Zoo in Washington, D.C., where he became the living symbol of Smokey Bear and of forest fire prevention. The living symbol of Smokey can be visited today at the National Zoo.

Preventing fires is important. People should be careful with matches, cigarettes, and campfires—especially when they are in or near the forests. Remember, Only YOU Can Prevent Forest Fires.

St. Florian and the Fire Service

(Source: Cork Fire Brigade Centenary Review, 1877-1977. Cork Corporation Fire Department, Ireland.)

Florian was born about 250 A.D. in Cetium, which is now Weisselmauer, Austria. He joined the Roman army as a youth, and, through diligence to duty, advanced through the ranks. By the year 305, his administrative abilities had won the high regard of Emperor Diocletian and his chief aide, Maximian.

Thus, Diocletian was shocked when he learned that Florian was not carrying out his edict to persecute all Christians in the area. Aquilinus, a man historians describe as a "ruthless enforcer," was dispatched to Eastern Bavaria with orders from Maximian to "slaughter all believers in Christ" and to investigate Florian's behaviour. Leaving a trail of blood behind him, Aquilinus confronted Florian in Lorch, and sentenced him to death by fire.

Standing on his funeral pyre, Florian is reputed to have challenged the Roman soldiers to light the fire, saying, "If you do, I will climb to heaven on the flames." With apprehension, Aquilinus abandoned the idea of burning Florian. Instead a millstone was tied around Florian's neck and he was drowned in the nearby river Enns. Valerie, a pious lady, had his body recovered and buried him on her country estate.

About 600 years later, sometime between 900 and 955, a monastery was erected near the tomb, and subsequently the village of St. Florian grew up around it. This monastery, under the care of the Augustinians since 1071, is one of the oldest in the world and is a sanctuary for art treasures. Following ancient custom, pilgrims assemble at the monastery's church each year on 4 May, St. Florian's feast day, to participate in special services.

St. Florian was adopted as patron saint of Poland after Pope Lucius III consented to the request of King Casimir to send relics of Florian to that country. Soon after, a person was saved from a fire by invoking St. Florian's name. Since then, Florian has been invoked against fire and has generally been regarded in most countries as the patron saint of the fire service.

Fire Marks

Valued today as collector's items, fire marks once meant the difference between receiving organized help in fighting a fire or no help at all.

Starting in Philadelphia in 1752, each fire insurance company developed its own distinctive fire mark which might be likened to a corporate "logo" today. As a firm designed its fire mark, it had copies cast in lead or carved of wood and painted. It then nailed one fire mark in a conspicuous place on each building it insured.

Insurance companies next began to offer rewards for fire fighting assistance in saving their properties. Fire marks — or their absence — helped competing fire brigades decide whether or not it was worth their while to try to extinguish a fire.

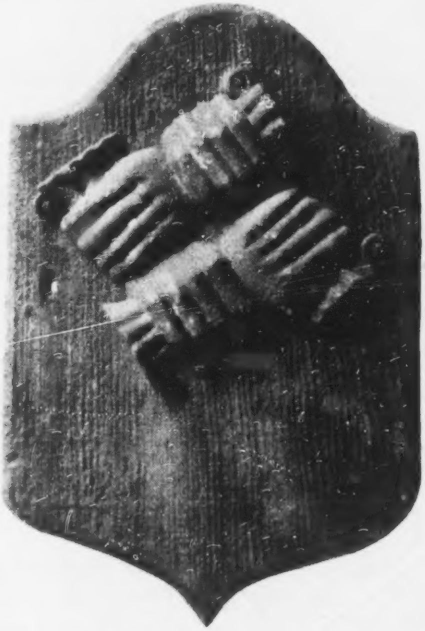
At the sound of a fire alarm, every brigade within earshot responded "in a furious dash," according to one writer. "It was the case of winner take all, the first company arriving having the undisputed privilege of dealing with the flames. If a house bore a fire mark — no matter whose — it was a guarantee that the brigade succeeding in beating the fire would receive its just due from the insuring company. Burning houses bearing marks therefore received energetic attention. But if a piece of burning property bore no fire mark, the gallant volunteers more often than not quickly left." (From "Fire Marks," copyright 1938 by the American Reserve Insurance Company, New York City.)

In 1752, the first fire mark appeared in America. This was also the year of the founding of the first American fire insurance company, the Philadelphia Contributionship. The new firm based its mark on a design used in London as early as 1714. The emblem was known as a "Double Hand-in-Hand," depicting two pair of hands, each hand grasping the wrist of another, with the resulting square formation mounted at an angle to form a diamond. The clasped hands were in an arrangement commonly known today as the "Boy Scout Grasp" or, in England, the "Lady-to-London" grip which is almost unbreakable, signifying great strength and said to also represent trust, faith and goodwill.

Some early insurance companies decided not to insure houses with trees nearby, because trees often caught fire and helped spread flames from one structure to another. Citizens who wanted both trees on their property and fire insurance organized the Mutual Assurance Company in 1784 and, almost inevitably, chose "The Green Tree" as their fire mark.

Following the Hand-in-Hand, Green Tree, American Eagle, and other early fire mark designs with ideological and patriotic origins, came marks reflecting developments in fire fighting. Designs showing a fire hydrant with hose attached, a fire engine, and a fire hydrant, reflected the gradual improvement in apparatus.

Green Tree (Courtesy Insurance Company of North America)



Hand-in-Hand (Courtesy Insurance Company of North America)

The use of fire marks generally declined after 1871, when Philadelphia instituted its first paid city fire department. Fire marks were issued rarely after that time, and only for advertising purposes.

Many fire museums have at least a few fire marks in their collections for visitors to enjoy. One of the largest American collections of fire marks was gathered by Harold V. Smith, former President of The Home Insurance Company, and housed until recently in the firm's skyscraper headquarters in New York City. The entire collection is being merged with historic holdings of the New York City Fire Department for display in a newly restored landmark firehouse in lower Manhattan. Among the major reference books on fire marks is *Footprints of Assurance* by Alwin E. Bulau, published in 1953 by The Macmillan Company, New York, and copyrighted by The Home Insurance Company.

Fire Service Recognition Day

The second Saturday in May annually is Fire Service Recognition Day as designated by the International Association of Fire Chiefs (IAFC). This day is designed "to focus attention on the varied and technical services being offered by fire departments of the United States and Canada."

Emphasis is on the fact that, in the IAFC's words, "Today's firemen are technically trained and highly skilled professional public servants. They perform many public services in addition to the suppression of fire, such as dwelling inspections, pre-fire planning, inspections of commercial industrial facilities, hospitals, schools and rest homes."

On Fire Service Recognition Day, "citizens are urged to visit their nearest fire station to become acquainted with these men, their apparatus and equipment and the professional type service they provide."

For a brochure on suggested activities, a model Mayor's Proclamation and other helpful materials, write the IAFC, 1329 - 18th St. NW, Washington, DC 20036

Fire Fighters Memorial Sunday

The first Sunday of October has been designated "Fire Fighters Memorial Sunday." Sponsored by the International Association of Fire Fighters (IAFF), it began October 7, 1979, with the first Presidential Proclamation for Fire Fighters Memorial Sunday, signed by President Jimmy Carter.

The resolution calling for establishment of a Memorial Sunday was introduced by Fort Worth, TX, Local 440 of the IAFC at the 1976 IAFC national convention, held in Denver, CO. The first observance, three years later, fell during the visit of Pope John Paul II to the United States; the Pope was in Washington, DC on Sunday, October 7, 1979.

Further information is available from the IAFF, 1750 New York Ave. NW, Washington, DC 20006; (202) 872-8484.

Fire Prevention Week

Sponsored by the National Fire Protection Association (NFPA), Fire Prevention Week (FPW) is always the full week — Sunday through Saturday — that includes the date of October 9.

The ninth of October marks the anniversary of the "Great Chicago Fire of 1871" which killed 250 people, left 100,000 homeless, destroyed 17,430 buildings and blackened 2,100 acres at a cost of $168 million. A national interest in fire prevention as well as fire fighting emerged as a result of this fire. The ideas of using building materials that wouldn't catch fire quickly, separating buildings, and widening streets to prevent fire from spreading easily soon developed.

In 1911, the Fire Marshals Association of North America (now the Fire Marshals Section of NFPA) suggested that the 40th anniversary of the Chicago fire be set aside as a time to advise the general public about the need for fire prevention. The Fire Marshals Association sponsored the first Fire Prevention Day on October 9, 1911.

President Woodrow Wilson issued the first national Fire Prevention Day proclamation on October 9, 1920.

Since 1922, Fire Prevention Week has been the Sunday-through-Saturday period including the date of October 9, and since that year NFPA has been the sponsor of FPW. President Warren G. Harding proclaimed the first Fire Prevention Week, October 2-9, 1922, to be observed "by every man, woman, and child, not only during the week designated in this pronouncement but throughout every hour of every day of the year."

Each year, NFPA selects an official Fire Prevention Week slogan and produces the official FPW poster. Activities to observe FPW are conducted at the local level, and are usually sponsored by the Fire Department, Chamber of Commerce, and/or other community organizations. Popular activities include parades, open house at the fire stations, exhibits, essay and poster contests conducted in the schools and in Scouts and other youth groups, and door-to-door home fire inspections accompanied by handouts of fire prevention literature.

Since 1966, Operation EDITH (Exit Drills In the Home) has been an important part of Fire Prevention Week in many communities. EDITH encourages families to plan ahead for escape in case of fire, and to join their neighbors in a simultaneous "rehearsal" of their escape plans. EDITH generally is scheduled for 8 o'clock p.m. on the Wednesday in Fire Prevention Week.

EDITH was introduced in Kansas City, MO in 1958. Since 1966, it has been sponsored by the Fire Marshals Association of North America, the Fire Marshals Section of NFPA.

Canada traditionally observes FPW at the same time the United States does, with a national proclamation issued each year by an official of the Canadian government.

Materials to support local FPW activities are available from NFPA around the first of June each year. The Marketing Division provides the FPW Promotion Kit that contains current poster, other print and audiovisual materials for audiences of all ages, and quantity prices. The Public Affairs Division distributes the free Media Kit of sample articles for newspapers and magazines and the free Public Service Announcements Kit of "spots" for use on radio and as scripts for TV.

Write to both Marketing and Public Affairs at NFPA, Batterymarch Park, Quincy, MA 02269, or telephone (617) 328-9290. Orders for Fire Prevention Week materials are taken by the Publications Sales Division, (617) 328-9230.

Future Fire Prevention Week Dates at a Glance

1984 - October 7-13
1985 - October 6-12
1986 - October 5-11
1987 - October 4-10
1988 - October 9-15
1989 - October 8-14
1990 - October 7-13

National Fire Prevention Week Slogans 1957-83

Don't Give Fire a Place to Start — 1957, 1958, 1960, 1961, 1963, 1965
Fire Prevention Is Your Job...Too — 1959, 1962, 1964
Fight Fire — 1966

Fire Hurts — 1967, 1968, 1969, 1970, 1971, 1972
Help Stop Fire — 1973
Things That Burn — 1974
Learn Not to Burn — 1975, 1976
Where There's Smoke, There Should Be a Smoke Alarm — 1977
You Are Not Alone! — 1978
Partners in Fire Prevention — 1979, 1980
E.D.I.T.H. — Exit Drills In The Home — 1981
Learn Not to Burn—Wherever You Are — 1982
Learn Not to Burn All Through the Year — 1983

Chemical Fire Apparatus

(Source: The Fairchester Hose Haulers Association)

The first chemical fire apparatus used by the fire department, and a forerunner of the chemical engine, was the "fire extinguisher wagon." This apparatus, equipped with 10 hand extinguishers, was commissioned by the Boston Fire Department in 1871 and designated as Extinguisher Co. No. 1. In 1872, two more of the fire extinguisher wagons, each carrying 25 extinguishers, were put into service in Boston.

Research shows that the Babcock Manufacturing Co., of Chicago was the first American builder of wheeled chemical engines for fire department service. These engines were of the upright stationary-tank type. The acid was mixed in the solution by inverting a lead container. A hand pump was provided for refilling the chemical cylinders from water sources. These chemical units were delivered to the Chicago Fire Department in 1872. In 1873, Charles T. Holloway of Baltimore introduced the first wheeled chemical engine to the Boston Fire Department. Boston also purchased one of the Babcock engines and before long Boston owned 12 chemical engines.

Chemical apparatus came into use when most fires were fought with streams from 2-½-inch hose lines on hand- or steam-operated apparatus. Few communities, however, had adequate water mains. So at first it was thought that all hand and steam fire engines could be replaced with chemical engines carrying 100 to 200 gallons of water. When the water was mixed with "magic" chemicals and projected through a 1-inch hose, these engines could extinguish any fire using a 2-½-inch hose stream.

But chemical engines were overrated and soon their limitations were realized. They became "first-aid apparatus" instead. Chemical engines were of the double upright-tank type, with a third tank carrying reserve water supply. The 1-inch hose was on a reel under the driver's seat. The chemical engine companies also had a second piece of apparatus called a "water tender." These apparatus could charge alternately the tanks and by refilling its supply from hydrants, steamers, or hand pump could keep operations going almost indefinitely.

Combination Apparatus

(Source: The late Clarence E. Meek, F.D.N.Y. Librarian with the assistance of Assistant Librarian Fireman Paul F. Stolz, F.D.N.Y. who researched and translated.)

About 1890, hose wagons began to replace hose reels. The hose wagons of Somerville, MA were equipped with a chemical tank, hose reel and three-horse hitch. These apparatus generally carried one 50- or 60-gallon tank or two 35-gallon tanks.

The first automobile apparatus followed the body designs of the combination hose and chemical wagons. In 1913, Charles A. Fox, of Ahrens-Fox, conceived the idea of mounting a small capacity front end pump and water tank on a motor hose wagon, instead of the commonly used chemical tank. He named the water tank and pump assembly "Booster." The original "Booster" apparatus was placed in service by the Cincinnati Fire Department. The idea of putting a small stream of plain water on a fire through a "garden hose" was openly ridiculed by many fire fighters and officers who still thought that "chemicals" had extinguishing qualities not possessed by ordinary water. However, the "Booster" grew rapidly in favor and soon displaced the chemical engines and chemical combinations.

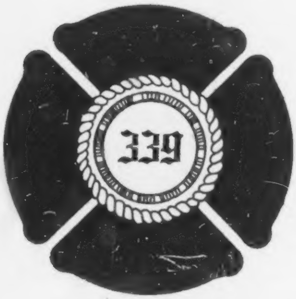
Fire Service Emblems

History of the Maltese Cross

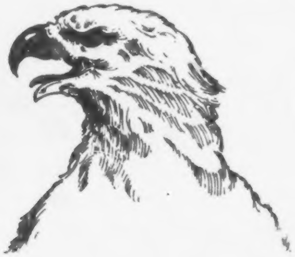
The insignia of the fire service is the Cross Pattee-Nowy, otherwise known as the Maltese Cross. This cross represents the fire service ideals of saving lives and extinguishing fires.

The fire service borrows the emblem of the cross from the Knights of St. John of Jerusalem, a charitable, non-military organization that existed during the 11th and 12th centuries. A white or silver cross on a dark background was adopted by these Knights or Hospitallers, as they were also known, because of their charity toward the sick and poor in setting up hospices and hospitals. Later, they assisted the Knights of the Crusades through their goodwill and also through military assistance in an effort to win back the Holy Land. The Knights of St. John eventually moved to the Island of Malta, the island for which the Maltese Cross was named.

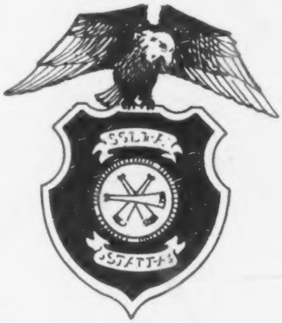
The need for an identifiable emblem for the knights had become crucial. Because of the extensive armor which covered their entire bodies and faces, the knights were unable to distinguish friend from foe in battle. They chose the cross of Calvary as their symbol since they fought their battles for a holy cause. The cross was later called the "Maltese Cross" and represented the principles of charity, loyalty, chivalry, gallantry, generosity to friend and foe, protection of the weak, and dexterity in service.



Maltese Cross



Eagle



Phoenix

During the Crusades, many knights became fire fighters out of necessity. Their enemies had resorted to throwing glass bombs containing naphtha and sailing their war vessels containing naphtha, rosin, sulphur, and flaming oil into the vessels of the knights. Many knights were called to perform heroic deeds by rescuing fellow knights and extinguishing fires. In acknowledgement of these feats, the cross worn by these knights was decorated and inscribed. This was considered a most honorable acclaim.

The Phoenix

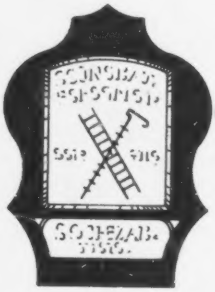
Other emblems of the fire service today can be traced back in history. The Phoenix, a bird nearly equal in size to the Eagle, was symbolic to the early Christians of the resurrection of Christ and of eternal life. Legend tells us that the Phoenix would set a fire and renew its strength and youth, emerging from the ashes as beautiful as ever. The Phoenix can be found on fire hats, flags, badges, and fire department seals.

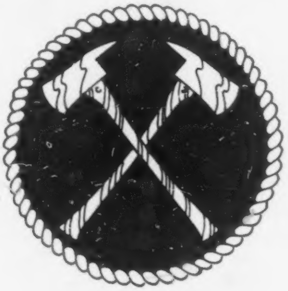
The Eagle

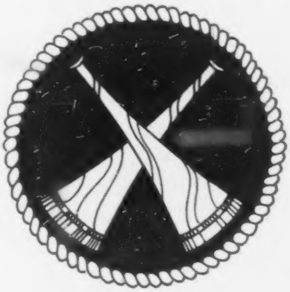
The Eagle, veritably a symbol of courage and majesty, is displayed with extended wings on the crests and shields of high-ranking officers. This symbol signifies that the wearer is a person of authority. The open wings stand for charity and protection; the beak and talons represent enforcement of discipline.

The Badge

The badge of the fire service is in the shape of a shield containing the Maltese Cross on either the crest or the shield. During the Crusades, shields were used by the knights as protective gear to guard against the enemy. In a similar sense, the fire service acts as a shield, a form of protection against the enemy of fire.







A rope or cord, forming an unbroken circle and symbolic of unbroken service and loyalty, can often be found decorating the badge, forming a border. Inside this circle are found various emblems, each representative of a trait, an event, etc. Crossed ladders indicate one who was "extremely brave" in battle. Crossed arms, axes, ladders, etc. in the form of "St. Andrew's Cross" represent one who was "the bravest." Fire chiefs today wear the badge with the cross and crossed speaking trumpets denoting rank; one silver trumpet is a lieutenant; two silver trumpets, a captain; two gold trumpets, crossed, battalion chief. Five crossed trumpets is the Chief Engineer.

Colors

Colors were symbolic during the Crusades as they are to the fire service today. "Blue" represented sincerity and truth as in the "Blue of the Uniform." White or silver stood for peace; red for nobleness; gold or yellow for generosity and elevation; and black for grief.

The colors of the badge, crest and frontpiece of the fire helmet indicate the rank of the fire service—gold and white for a chief; white and black for an officer below rank of chief.

Fire Museums

United States

Alabama

Museums of the City of Mobile
Mobile

The Phoenix Fire Museum
203 S. Clairborne St.
Mobile

Arizona

Hall of Flame
6101 E. Van Buren
Phoenix

Hall of Flame
National Historical Fire Foundation
Scottsdale

California

Knott's Berry Farm
Buena Park

State Park
Columbia

Old Plaza Fire House
Los Angeles

Travel Town
Griffith Park
Los Angeles

Sutter Museum
Sacramento

The Firehouse Museum
1572 Columbia St.
San Diego

San Diego Historical Society Museum
P.O. Box 10571
San Diego

Firemen's Fund Insurance Co.
San Francisco

San Francisco Fire Dept.
Pioneer Memorial Museum
655 Presidio Ave.
San Francisco

Pioneer Museum and Haggin Galleries
Pershing Ave. & Rose St.
Stockton

Colorado

Alma Firehouse Museum
Alma

Denver Firefighters Museum
1326 Fremont Place
Denver

Connecticut

Connecticut Fire Museum
Rte. 140, Bridge St.
Warehouse Point

Delaware

Delaware State Museum
Dover

Washington, DC

District of Columbia Fire Safety Education Center & Museum
438 Massachusetts Ave., NW

The Friendship Fire Association Museum
4930 Connecticut Ave., NW

Smithsonian Institution

Florida

O'Meara Historical Collection of the American Fireman
Hialeah, FL

Hialeah Fire Engine Museum
Hialeah, FL

O'Meara's Fire Engines of Yesterday
Blowing Rock, NC
c/o Mr. Vincent H. O'Meara
974 E. 23rd St.
Hialeah

Jacksonville Fire Department Museum
12 Catherine St.
Jacksonville

The Carriage Cavalcade
Silver Springs

Illinois

Aurora Fire Museum
Michel St.
Aurora

Chicago Historical Society Museum
North Ave. & Clyde St.
Chicago

Museum of Science and Industry
Chicago

National Historical Fire Foundation
400 N. Michigan Ave., Suite 711
Chicago

Indiana

The Firefighting Gallery of Indianapolis
30th & Meridian
Indianapolis

Louisiana

Louisiana State Museum
New Orleans

Presbytere Museum
751 Chartres St.
New Orleans

Maine

Portland Veteran Fireman's Association
Portland

Lincoln County Fire Museum
Federal St.
Wiscasset

Maryland

Baltimore Fireman's Museum
423 N. Gay St.
Baltimore

Museum of the Baltimore Equitable Society
Baltimore

Museum of the Box 414 Association, Inc.
Baltimore

Fire Museum of Maryland
Heaver Plaza
1301 York Rd.
Lutherville

Salisbury Fire Department Museum
143 S. Division St.
Salisbury

Massachusetts

New England Fire and History Museum
Route 6A
Brewster

Museum of Transportation
15 Newton St.
Brookline
(Temporarily closed; for
information, call (617) 522-6140)

Bear Cove Fire Museum
229 North St.
Hingham

National Fire Museum
21 Endicott St.
Newton Highlands

Society for the Preservation of New England Antiquities
Norwell

Berkshire Museum
Pittsfield

Essex Institute
Salem

Edaville Railroad and Museum
South Carver

Old Sturbridge Village
Sturbridge

The Atlantic Museum
1 Burrill St.
Swampscott

Townsend Fire Department Museum
Townsend

New England Fire Truck Museum
P.O. Box 471, Rte. 6
Wareham
(Owned by Chief Everett Booker, Retired)

Michigan

Henry Ford Museum & Greenfield Village
Dearborn

Poll Museum
U.S. 31 at New Holland St.
Holland

Kalamazoo Public Museum
Kalamazoo

Minnesota

Austin Firefighting Museum
Austin

Lumbertown USA
Brainerd

Hinckley Fire Museum
Hinckley

Missouri

The Missouri Historical Society/Jefferson Memorial
Forest Park
St. Louis

Montana

Yellowstone County Museum
Municipal Airport
Billings

Nebraska

Harold Warp's Pioneer Village
Minden

Nevada

Nevada State Museum
Carson City

Last Frontier Village
Las Vegas

New Hampshire

Manchester Historic Association
Manchester

New Jersey

New Jersey Firemen's Home
565 Lathrop Ave.
Boonton

Newark Fire Museum
49 Washington St.
Newark

Newton Fire Museum
150 Spring St.
Newton

James E. Lesnick Fire Museum
217 Willow Ave.
Piscataway

New Jersey Fire Museum
177 Valley St.
South Orange

Meredith Havens Fire Museum
244 Perry St.
Trenton

New York

New York State Museum
Cultural Education Center of the Empire State Plaza
Albany

Long Island Old Fire Engine Collection
Baldwin

Brooklyn Public Library
Brooklyn

Signal 7-7 Museum
326 Livington St.
Brooklyn

Ye Olde Fire Station Museum
8862 Cicero-Brewster Rd.
Cicero

American Museum of Firefighting
Firemen's Home
Hudson

Smith's Cove
Old Museum Village
Monroe

Museum of the City of New York
5th Ave. & 103rd St.
New York

New York City Fire Museum
104 Duane St.
New York

Long Island Automotive Museum
Southampton

Jefferson County Historical Society Museum
228 Washington St.
Watertown

North Carolina

The New Bern Firemen's Museum
Central Fire Station
New Bern

Ohio

Cincinnati Fire Department Museum
315 West Court St.
Cincinnati

Nationwide Insurance Display
North High St. & Nationwide Blvd.
Columbus

Ohio State Museum
Columbus

Allen County Historical Museum
Lima

Varnes Fire Museum
8168 S. Bedford Rd.
Macedonia

Oklahoma

Oklahoma State Firefighter's Museum
2716 NE 50th St.
Oklahoma City

Oregon

Jacksonville Museum
Jacksonville

Pennsylvania

Old Economy Museum (Harmony Society)
Ambridge

Lincoln Fire Station
Bethlehem

Chambersburg Volunteer Firemen's Museum
441 Broad St.
Chambersburg

Buda County Historical Society
Doylestown

Doylestown Museum of Historical Vehicles
Doylestown

Firefighters Historical Museum, Inc.
West Fifth and Chestnut Sts.
Erie

Hershey Museum
Hershey

Atwater Kent Museum
Philadelphia

INA Corporation Collection
CIGNA Corp.
1600 Arch St.
Philadelphia

The Franklin Institute
Philadelphia

Philadelphia Fire Department Museum
149 North 2nd St.
Philadelphia

The York County Fire Museum
West Market and Carlisle Ave.
York

Rhode Island

Jamestown Fire Department Memorial Museum
Jamestown

South Carolina

Charleston Museum
Charleston

Tennessee

Memphis Fire Department Museum
2 Avery St.
Memphis

Texas

Dallas Firefighters Museum
3801 Parry
Dallas

Fire Museum of Texas
702 E. Safari Parkway
Grand Prairie

San Antonio Museum Association
San Antonio

Vermont

Shelburne Museum
Shelburne

Virginia

Friendship Fire Engine Company Museum
107 S. Alfred St.
Alexandria

Steamer Company No. 5 Museum
200 W. Marshall St.
Richmond

Washington

Gamon Museum & Wagons
Mabton

Washington State Fire Service Historical Museum, Inc.
16231 - 11th Ave., NE
Seattle

Wisconsin

Hall of Flame
Highways 31 and 43
Kenosha

Milwaukee County Historical Society
Milwaukee

Peshtigo Fire Museum of Northern Wisconsin
400 Oconto Ave.
Peshtigo

Fire House No. 3 Museum
6th St. & Grand Ave.
Racine

Canada

Montreal Auxiliary Firemen Museum
St. Laurence Blvd. & Laurier Ave.
Montreal, Quebec

Chateau de Ramssay
Montreal, Quebec

Western Development Museum
Moose Jaw, Saskatchewan

Firefighters Museum of Nova Scotia
Nova Scotia

Toronto Fire Department Museum
Eastern Ave.
Toronto, Ontario

Firefighters' Museum of Nova Scotia
Yarmouth, Nova Scotia

Europe

Austria
Burgenlandisches Feuerwehrmuseum
Landes-Feuerwehr-Schule
Leithabergstrasse 41
A-7000 Eisenstadt

Feuerwehr-Museum
FF Laxenburg (VFD)
A-Laxenburg

Museum der Fa. Rosenbauer
Paschinger Strasse 90
A-4021 Leonding (Linz)

Niederosterreichisches Feuerwehrmuseum
Landes-Feuerwehr-Schule
Nassallee 4
A-3430 Tulln

Wiener Feuerwehrmuseum
Vienna F.D., HQ-Station
Am Hof 7
A-1010 Wien

England
The Yorkshire Fire Museum
Bradford Rd.
Batley, West Yorkshire

Hungary
Firefighters' Museum of Budapest
Budapest

West Germany
Feuerwehr-Museum Dietzenbach
Schiller-Str. 30A
D-6057 Dietzenbach

Deutsches Feuerwehr-Museum
An St. Florian 4
D-6400 Fulda

Feuerwehr-Museum
Feste Oberhaus
D-8390 Passau

Feuerwehr-Museum Salem
Salem Monastery
D-7777 Salem

Feuerwehr-Museum Schwabisch-Hall
Neue Str. 26
D-7170 Schwabisch-Hall

Feuerwehr-Museum Waldmannshofen
Agnes-Schreiber-Str. 15
D-6990 Bad Mergentheim

Feuerwehr-Museum Winnenden
Mark Str. 11
D-7057 Winnenden

Fire Buff Clubs

Buff. A fire department enthusiast. (See also fire fan, "go-fer," ringer, spark, sparky.)

Thus reads the "buff" entry in the book *Fire Terms* published by the National Fire Protection Association. Pursuing the reference words, under "fire fan" is the definition "an individual interested in fires and fire fighting." A "go-fer" is a fire buff, volunteer helper, or probie who runs errands for fire fighters. (Here's still another term, "probie," meaning "a probationer — a fire fighter recruit undergoing a period of training which must be satisfactorily completed in order to receive permanent appointment.") A "ringer" is a person who pretends to be a fire fighter, and/or a fire fan or buff who likes assisting fire fighters. And finally, a sparky, spark, or sparkle is an individual interested in fire and the fire service.

Fire buff clubs are made up of individuals with any or all of these special interests in fires, fire fighting, the fire service, fire apparatus (antique and modern), and volunteer assistance to fire fighters and fire departments. Activities of buff clubs range from restoring antique fire apparatus, organizing musters, and managing fire museums to providing canteen service at the scene of multiple alarm fires. Some buff clubs research and publish fire department histories, give awards to fire fighters, operate mutual aid fire communications systems, help in fire department public relations efforts, and do fire prevention and public education work in the community. Most clubs meet regularly for programs related to their varied interests.

Over 70 fire buff and fire service groups in the U.S. and Canada are members of the International Fire Buff Associates, Inc., with executive offices at 7509 Chesapeake Ave., Baltimore, MD 21210. Organized fire buff and fire service groups who are interested in affiliation with the International Association should write the Executive Office for information and a sample copy of their *Code for Fire Buffing*. The following list of fire buff clubs is from the 1982 edition of the *Visiting Fireman*.

United States

Arizona

2-11 Association of Phoenix Fire Buffs, Inc.
P.O. Box 9683
Phoenix
(602) 992-0826
Pres. Stuart Logan
Sec'y James Grubb

6-6 Fire Buffs of Arizona, Inc.
1903 W. Holly St.
Phoenix
(602) 256-0341
Pres. Dave Branch
Sec'y Bob Hatter

Southern Arizona Fire Buff's Association
3521 N. Flowing Wells Rd., Apt. 6
Tucson
Pres. Thomas A. Birch
V. Pres. Darren Cummings

California

The Box 15 Club of Los Angeles
P.O. Box 54158
Los Angeles
(213) 589-9592
Pres. Peter Balducci
Sec'y Janice Bass

Sacramento Fire Buff Club
P.O. Box 13862-A
Sacramento
(916) 969-4115
Pres. Edward W. Gardiner

Fire Associates of Santa Clara Valley
6494 Mojave Dr.
San Jose
(408) 736-1566
Pres. Leonard Williams
Sec'y Stan Kelso

Ahrens-Fox Fire Buffs' Association
600 E. Weddell Dr., Sp. 59
Sunnyvale
(408) 734-1074
Pres. Ed Hass

Colorado

Fellowship of Christian Firefighters International
P.O. Box 9324
Denver
(303) 841-4495
Pres. Duncan Wilkie

Connecticut

Connecticut Fire Photographer's Association
Sec'y-Treas. Alan Chaniewki
1012 Old Colony Rd.
Meriden or
State of Connecticut Fire Commission
294 Colony St.
Meriden
(203) 237-5642
Pres. Glenn Vincent

Box 22 Associates
424 Elm St.
New Haven

(203) 865-1234
Pres. Richard Gelinas
Sec'y William C. Celentano, Jr.

Connecticut Cellar Savers, Inc.
P.O. Box 553
Oxford
(203) 888-9332
Pres. Frederick J. Pommer
Sec'y Frances R. Pommer

Washington, DC

Friendship Fire Association
4930 Connecticut Ave., NW
Pres. Bruce Paquette
V. Pres. Bill Blackwood
Sec'y Walter Ellis

Florida

Fire Service in Philately
P.O. Box 3011
Rotunda West
(813) 474-7321
Pres. Gustave Knoeckel
Sec'y Glenn Hartley

Florida Antique Bucket Brigade
1514 West Palm Circle
Valrico
(813) 685-6110
Pres. Jim Briggs
Sec'y Sue Czaplicki

Georgia

Metropolitan Fire Associates of Atlanta, Georgia
Box 306
Avondale Estates
Atlanta
(404) 378-7601
Foreman Paul T. Talbott
Sec'y Dave E. Williams

The Fire Mark Circle of the Americas
2859 Marlin Dr.
Chamblee
(404) 451-2651
Pres. Henry A. Kroll
Sec'y Glenn Hartley, Sr.

Hawaii

Hawaii Fire Buffs Association
Sec'y Dennis Lewis
98-227 Kanuku St.
Aiea
Paul Fox (808) 553-2536
Pres. Charles "Doc" Kinney
V. Pres. Robert Van Dusen

Illinois

Fire Buffs of Illinois
5420 S. Kedvale Ave.
Chicago
(312) 585-1301
Pres. Jack Connors
Sec'y Dennis Adamski

5-11 Club, Inc.
P.O. Box 8511
Chicago
(312) 867-6114
Pres. Ken Falk
Sec'y Nancy Quinn

Smokey Row Hose Company No. 1
107 N. Prairie
Dwight
(815) 584-2083
Chiefs:
  Alex McWilliams
  Jay Erickson
  Margo Erickson
  Tom Laun
  Dianne Clement
  S. "Boots" Riccolo

Chicago Fire Fans Association
404 N. Roy Ave.
Northlake
(312) 562-8619
Pres. Hyman Levine
Sec'y William F. Scharlau

10-87 Club of Greater Rockford
P.O. Box 1087
Rockford
(815) 398-5233 or
(815) 226-1837
Pres. James J. Olesen
Sec'y Cindy Maschke

Indiana

Indianapolis Fire Buffs
5141 S. Madison Ave.
Indianapolis
(317) 283-6672
Pres. R. Michael "Mike" Baer
Sec'y William R. Zimmer

Metropolitan Fire Associates
712 St. Joseph Bank Building
South Bend
Pres. William Carlson (219) 232-6168

Louisiana

Signal "51" Group
830 Erie St.
Shreveport
(318) 865-5783
Pres. Norman Zaffater
Sec'y Harvey L. Carter, MD

Maryland

Box 414 Association, Inc.
824 Fifth Ave.
Baltimore
(301) 242-0743
Pres. Charles A. Ashley, Jr.
Sec'y Charles C. Price

International Fire Buff Associates, Inc.
c/o Roman A. Kaminski, Exec. V. Pres.
7509 Chesapeake Ave.
Baltimore
(301) 477-1544
Pres. Theodore G. "Ted" Main
Sec'y Keith F. Franz

Ladies' Auxiliary of Box 414 Association, Inc.
7509 Chesapeake Ave.
Baltimore
(301) 477-1544
Pres. Mrs. Roman A. Kaminski (Gertrude)
Sec'y Mrs. Julian Katzenberg (Margie)

Pompier Club
815 Stoneleigh Rd.
Baltimore
(301) 377-8212
Pres. Norman C. Keyes, Jr.
Sec'y Charles H. Briggs

S.H.C. Association
632 N. Fremont Ave.
Baltimore
(523) 728-8994
Pres. Delmar E. Davis
Sec'y Arthur P. Hardy

Massachusetts

Fire District No. 2 Antique Fire Apparatus Club
845 Main St.
Box 124
Agawam
(413) 768-8746
Pres. Raymond K. Pond
Sec'y James Taylor

Boston Sparks Association, Inc.
99 W. Fourth St.
Boston
(617) 269-9700 (evenings)
Pres. Robert J. Melinn
Sec'y Richard N. Bangs

Box 52 Association, Inc.
17 Linden St.
Everett
(617) 387-1036
Pres. Robert A. Doyle
Sec'y Richard W. Somerville

Essex County Fire Wardens' Association
162 County Rd.
Ipswich
Pres. William Carter
Sec'y Norman Stone

New England States Veterans Firemen's League
16 S. Pond St.
Newburyport
(617) 465-3948
Pres. Fritz Hilbert
Sec'y Stan Dixon

Massachusetts Antique Fire Apparatus Association
P.O. Box 3332
Peabody
(617) 352-8117
Pres. James F. Dillion
Sec'y Sandy Angus

Tapper Club of Boston, Inc.
P.O. Box 388
Weymouth
Pres. Elbert Enos
Sec'y Frank J. San Severino

Michigan

Greenfield Village International Antique Fire Apparatus Association
Greenfield Village, Dept. SE
Dearborn

Box 42 Associates
P.O. Box 42
Detroit
(313) 821-0061
Pres. Anthony Isaac
Sec'y Ted Main

Detroit Fire Buffs Association
5752 Courville Rd.
Detroit
(313) 855-6725
Sec'y to Board of Governors Joseph M. Burch

321 Association, Inc.
38 LaGrave Ave., SE
Grand Rapids
(616) 453-6638
Pres. Robert Van Campen
Sec'y Dennis Morrow

Box 12 Associates
1227 Workshire
Grosse Pointe
(313) 882-1039
Pres. Mark Beltaire
Sec'y Martin Barahl (313) 566-0700

Minnesota

Extra Alarm Association of the Twin Cities
1801 W. 59th St.
Minneapolis
(612) 571-7370
Pres. Ralph Messer
Corr. Sec'y Steve Skaar

Missouri

Box 8 Club of St. Louis
P.O. Box 1521
St. Louis
(314) 776-6748 or (314) 781-2201
Pres. Jan C. Faulstich
Sec'y Robert E. Reising

New Jersey

Greater Essex Fire Brigade, Inc.
11 Orchard St.
Bloomfield
(201) 748-4658
Pres. Robert L. Kane
Sec'y G. Grant Miller

Gong Club, Inc.
P.O. Box 213
Jersey City
(201) 333-9147
Pres. Frank Bohrman
Sec'y Ron Jeffers

Bell and Siren Club
44 Mount Prospect Ave.
Newark
(N.F.D. Rescue No. 1)
(201) 226-3280
Sec'y Ira Cohen

South Jersey Fire Buffs Association, Inc.
2419 42nd St.
Pennsauken
(609) 665-6464
Pres. Robert C. Bartosz
Sec'y W. Earle Doan

Box 54 Club
P.O. Box 54
Teaneck
(201) 836-7125
Pres. Edward Black
Sec'y George Miros

Signal 22 Association, Inc.
1100 Brunswick Ave.
Trenton
(609) 587-0077
Pres. Irving Charlip
Sec'y Howard M. West III

Fire Apparatus Model Builders Association
P.O. Box 749
Union City
(609) 882-8502
Pres. Ken Kandrac
Sec'y Ron Jeffers

Glasstown Antique Fire Brigade
49 N. Myrtle St.
Vineland
Pres. James Mulch
Sec'y Nancy Howe

New York

The Brockport Fire Department S.T.E.A.M.E.R.S.
38 Market St.
Brockport
Fire Chief Norman J. Knapp (716) 637-2512
Pres. Gary Demler (716) 637-6974

The Grey Ghost Exempt Association
237 S. Main St.
Brockport
Norman J. Knapp (716) 637-2512
Scott Warthman (716) 637-6896

New York Firemen's Cycle Club
95 W. 195 St.
Bronx
(212) 543-5982
Pres. Dr. J.W. Goldenkrantz
Sec'y Dr. A.S. Birnbaum

Citywide Disaster Services, Inc.
P.O. Box 208
Brooklyn
(212) 377-5161
Directors:
Arthur E. Kaye
Glen Konwaler
Keith Brooks

Signal Seven-Seven Fire Club
486 14th St.
Brooklyn
(212) 768-9479
Pres. John G. Dwyer
Sec'y Robert Carpenter

Fire Bell Club of Buffalo, Inc.
700 Niagara Frontier Blvd.
Buffalo
Pres. John W. Bisantz
V. Pres. Donald W. Holland
Sec'y-Tres. James T. Duggan

Staff Chiefs Association-New York Fire Dept.
28-02 Marinette St.
Douglaston
(212) 225-5711
Pres. retired Asst. Chief Francis J. Love
Sec'y-Tres. retired Asst. Chief Charles J. Stressler

Fire Bell Club of New York
Suite 58, Hotel New York Statler
7th Ave. at 33rd St.
New York
(212) PE6-5000, Ext. 6269
Pres. Frank Donnelly (212) 332-9903
V. Pres. Jack Lerch (212) 888-5209 (office) or (212) 796-2886 (residence)
Sec'y Bill Ladell (212) 965-8377
Treas. Frank Daly (212) 678-3136

Third Alarm Association
150 Amsterdam Ave.
New York
Pres. H. Wegner
Sec'y E. Leonard

Long Island Fire Photographers Association
456 48th St.
N. Lindenhurst
(516) 967-1175
Pres. Bill Meyer
Sec'y Lenny Kostas

Fairchester Hose Haulers Association, Inc.
P.O. Box 6
Pelham
(914) 738-1289
Pres. G. Marshall Sanford
Exec. Sec'y Warren P. Lyon

Box 333 Association
1102-3rd St.
Rensselaer
Pres. Michael F. Mann
Sec'y Philip B. Smith

Naer Tormid Society of the Fire Dept. of the City of New York
835 Willowbrook Rd.
Staten Island
(212) 761-1937
Pres. Raymond Simms
Sec'y Stephen L. Klein

Signal 88 Fire Buff Club, Inc.
P.O. Box 91
Staten Island
(212) 981-8972
Pres. Fred J. O'Neill
Sec'y Charles (Chip) McLean

Society for the Preservation and Appreciation of Antique Fire Apparatus in America
P.O. Box 450
Eastwood Station
Syracuse
Pres. Frank Tremel
Sec'y Marvin Cohen

The Box 17 Club
75 Eagle St.
Troy
(518) 272-8892
Pres. Raymond Henry

Ohio

Box 13 Associates
3103 Manning Ave.
Cincinnati
(513) 242-3733 (Pat Holz)
Pres. David T. Sheehy
Sec'y David F. Berry

Extra Alarm Fire Association, Inc.
6606 Buckingham Pl.
Cincinnati
(513) 271-6175
Pres. George F. Ross
Sec'y Ronald N. Hill

Western Reserve Fire Buffs Association
P.O. Box 5013
Cleveland
(216) 521-2198
Pres. Bill Varnes
Sec'y John McCown

Box 15 Club, Inc.
1296 Carbone Dr.
Columbus
(614) 267-9594
Pres. Larry Parlett
Sec'y Charlie Pickard

Miles Greenwood Historical Fire Apparatus Society
605 Garfield
Milford
(513) 831-6398
Pres. Howard Kuhnell
Sec'y Steve Hagy

Oklahoma

Tulsa Fire Buff Association
8945 E. 58 St.
Tulsa
(918) 252-5241
Pres. Chuck Bigbie
Sec'y Pete Byrne

Pennsylvania

Second Alarmers Association of Philadelphia, Inc.
2900 Roberts Ave.
Philadelphia
(215) 745-4272
Pres. John C. Lewis
Sec'y George R. White

Rhode Island

Special Signal Fire Association
Box 454 - Annex
Providence
(401) 434-6358
Pres. Norman E. Gladding
Sec'y Noel N. Kerkhoff

Tennessee

Music City Pompier Club
6845 Pennywell Dr.
Nashville
Pres. Bill Ketchum

Texas

Box 4 Fire Buff Association
P.O. Box 2917
Dallas
(214) 528-6556
Pres. Bill Rucker
Sec'y Carl Reynolds

Virginia

National Society of Firemen's Parade Watchers and Fire Apparatus Picture4QL Takers of America
4101 Woodland Dr.
Fairfax
(703) 273-0051
Chairman Len Sasher

Washington

Last Resort Fire Dept. (Northwest Antique Fire Apparatus Association, Inc.)
1433 NW 51st St.
Seattle
(206) 783-4474
Pres. Earle L. Kahler
Sec'y Galen K. Thomaier

Seattle Fire Buff Society, Inc.
301 Second Ave., S.
Seattle
(206) 363-4203
Pres. Lew Brandenstein
Sec'y Robert W. Pitzer

Wisconsin

Badger State Fire Buffs
9775 W. Keefe
Milwaukee
(414) 463-5537 (Mark Hoeller)

Milwaukee Fire Bell Club, Inc.
[illegible]544 South Monaco Place
Hales Corners
(414) 342-7810
Pres. James Albanese
Sec'y Keith Franz

Racine Fire Bell Club, Inc.
P.O. Box 1042 or 700 6th St.
Racine
(414) 633-4305
Pres. Sy Helding
Sec'y Wilbur Tangerstrom

Canada
Box 12 Association
Toronto, Ontario

Box 43 Association
P.O. Box 506
10 John St. S.
Hamilton, Ontario 18N 3H8
(1-416) 335-2276
Pres. Gerry Hourigan
Sec'y Dave Lumsden

Ontario Fire Buff Associates, Inc.
P.O. Box 802
Station "Q"
Toronto, Ontario M4T 2N7
Pres. Gary J. Wignall
Sec'y Norman Weddum

Netherlands
Nederlandse Vereniging "De Brandweerhobbyist"
Postbus 813, 1200 AV Hilversum
Sec'y M. Siebelt
Eikbosserweg 71
1214 AG Hilversum

Additional Fire Buff Associates, Inc. Active Member Groups as of Feb. 24, 1982

United States

California
Peninsula Fire Buff Club
Redwood City

Pioneer Hook and Ladder Co.
San Diego

Phoenix Society of San Francisco
San Francisco

Florida
Greater Miami Code One Association, The
Coral Gables

Central Florida Fire Buffs Association
Orlando

Illinois
Moline Second Alarmers Association
Moline

Kansas
Wichita - Sedgwick Fire Service
Wichita

Louisiana
Firefighting Historical Association, The
Metairie

Maine
Box 61 Club, Inc. - Portland Fire Buffs
Portland

Maryland
Central Alarmers, Inc.
Baltimore

Anne Arundel Alarmers Association, The
Glen Burnie

Box 234 Association, Inc.
Pikesville

Massachusetts
Essex County Fire Wardens' Association
Lynnfield

Worcester West Forest Wardens' Association
Phillipston

Middlesex County Firefighters & Fire Wardens' Association
Winchester

New Jersey
Atlantic City Fire Reserve
Atlantic City

South Orange Volunteers
South Orange

New York
Signal Six-Six Fire Buff Club of New York City, Inc.
New York

Ohio
Central Ohio Fire Buffs Association
Columbus

Oklahoma
Box 3432 Fire Buff Club
Oklahoma City

Pennsylvania
Delaware Valley Fire Buffs Associates, Inc.
Philadelphia

Rhode Island
Special Signal Fire Association
Warwick

Texas
Fort Worth Red Helmets
Fort Worth

America '76 Hose Company
Houston

Wisconsin
Brookfield Fire Associates, Inc.
Brookfield

Canada
Metropolitan Toronto Multiple Alarm Association
Islington, Ontario

Lake Shore Fire Buff Association
Mississauga, Ontario

Ottawa Valley Fire Buffs
Ottawa, Ontario

Regional Niagara Fire Buff Association
St. Catharines, Ontario

Border City Fire Buffs
Windsor, Ontario

Fire Service Trivia

Fire Firsts

The first fire recorded on the island that was to become Manhattan occurred in 1628 when a dwelling caught fire and burned to the ground. Subsequently, during the reign of Governor Peter Stuyvesant, the first fire prevention and building code was established. Among other things, it allowed for creation of a committee to inspect all chimneys in Nieuw Amsterdam with the privilege of fining owners who did not keep chimneys swept clean. Stuyvesant also began a form of municipal fire protection, purchasing buckets for use during fires and establishing a fire warning system that featured selected individuals as fire watchers. These persons carried wooden rattles that made noise loud enough to rally nearby citizens for fire fighting.

(Kenneth Dunshee, *As You Pass By*)

In 1808, the first working hydrant was installed in New York City, attached to an underground wooden water main.

The first fire insurance office was established in England in 1667, one year after the Great Fire of London.

In 1736, Benjamin Franklin and several other prominent Philadelphians established the first organized fire brigade in America, which continued as the Union Fire Company for over 80 years.

In 1852, a patent was issued for the first sprinkler perforated pipe system designed by James Pichen Francis, proprietor of Locks and Canals at the Merrimac River in Lowell, Massachusetts. This probably was the first recognized installation of fixed fire protection equipment, but the full, expansive development of sprinkler systems did not really get under way for another 20 years.

In 1752, the first American fire insurance company was formed, under the inspiration of Benjamin Franklin of Philadelphia. This was the Philadelphia Contributionship for the Insurance of Houses from Loss by Fire. In 1792, the Insurance Company of North America was formed — the first American fire and marine insurance company. Other insurance companies sprang up, but contrary to the English custom, these companies did not maintain fire brigades of their own, but relied on the volunteer fire companies already flourishing.

The Los Angeles City Fire Department first organized a volunteer unit in 1871. It purchased an Amoskeag pumper and a hose cart, which were drawn by hand. The pumper was shipped from Massachusetts to San Francisco by rail, then had to be transported to Los Angeles in wagons drawn by mules. In 1874, when the volunteer engine company asked the city council to purchase horses to pull this heavy apparatus, the request was denied and the company disbanded.

(History of the Los Angeles Fire Department)

Arson Trivia

Arson was a serious and frequent problem in the early days of America, as indicated by this portion of law passed by the General Court of Massachusetts in 1652: "Enacted by the Authority of this Court that any person or persons whatsoever of the age of Sixteen years and upward, that shall after the publication hereof wittingly and willingly set fire any Barn, Stable, Mill, Out House, Stack of Wood, Corn or Hay, or any other thing of like nature, shall upon due conviction by testimony or confession, pay double damage to the party damnified, and be severely whipt.

The first American law relating to arson was enacted in Maryland in 1638, in the Session of the General Assembly. It decreed: "Malicious trespasses as to burn or destroy willfully a house or stack or corn or tobacco" as a felony. Penalties required the offender to "suffer the pain of death by hanging"; however, a less severe penalty was permitted: the offender could "lose his hand or be burned in the hand or forehead with a hot iron and shall forfeit all his land." A second offense required the death penalty.

Fire Service Trivia

In the 19th century, the location of a fire in New York City was indicated to fire fighters by a crimson ball or lantern suspended from the cupola of City Hall. The position of the ball to the cupola indicated the direction of the fire. At the same time, a heavy alarm bell was rung whose strokes pounded out the ward in which the fire was located. This auditory alarm was relayed throughout the city by church bells. One night, fires were discovered in separate locations. The lantern was shifted from one direction to another, with the result that the firemen raced about in circles while the flames raged unchecked. Finally, messengers were sent out to direct them, but not until fears had been raised for the safety of the entire city.

In 1774, George Washington was a member of the Friendship Fire Company in Alexandria, Virginia.

Throughout the history of the United States, but especially in the 18th and 19th centuries, most political and military leaders were members of volunteer fire departments at some time. George Washington, Thomas Jefferson, Alexander Hamilton, John Jay, Benedict Arnold and hundreds of other famous persons in history served as volunteer fire fighters.

Famous Fires Trivia

In a 1653 conflagration in Boston, Massachusetts, buildings exploded one after another as the fire involved gunpowder in each dwelling. The colonists used gunpowder for their muskets, as well as for blasting operations on their farms, so it was common practice to store barrels of this explosive in a convenient place in the building.

The "Great Fire of 1835" in New York City destroyed nearly the entire business portion of the city — about 13 acres and 700 buildings. Loss was estimated at 20 to 40 million dollars, a mammoth sum in those days.

In 1849, St. Louis, Missouri, suffered an epidemic of cholera, which arrived with the boatloads of immigrants and gold-seekers heading for California. When the epidemic was at its height, the "Great Fire" of May 17 occurred along the Missouri River, destroying 23 steamboats and 400 buildings in 15 city blocks, with losses estimated at more than $5 million.

In 1775, British ships sailed into Falmouth (now Portland), Maine, to burn that community to the ground as punishment for aggressive actions of the colonists. The fleet bombarded and burned 139 houses, 278 stores, and other buildings, but the people of Falmouth stayed in their town and eventually repulsed the enemy.

(Lossing's *Field Book of the Revolution*)

Jamestown, Virginia, the first American Colony to be settled (in 1606, under Captain John Smith) had a devastating fire in 1608 that destroyed most of the colonists' lodgings and provisions.

(David Lovejoy, *The Glorious Revolution in America*)

Reference

1984-85 Calendar of Events

January
Nevada Chapter, IAAI Monthly Meeting. For further information, contact: Deputy State Fire Marshal Jack Davis, Capitol Complex, Carson City, NV 89710.

Northern Nevada Fire Marshals Monthly Meeting. For further information, contact: Secretary/Treasurer Paul Huss, State Fire Marshal Division, Capitol Complex, Carson City, NV 89710.

Southern Nevada Regional Arson Task Force Meeting. For further information, contact: President Mike Patterson, 2626 East Carey Avenue, North Las Vegas, NV 89030.

January 7-8. Effective Rural Water Supply I, Connecticut State Fire School, Burrville, CT. For further information, contact: State Fire Administrator, Commission on Fire Prevention and Control, 294 Colony Street, Meriden, CT 06450.

January 11-19. Fire Service Instructor I, Connecticut State Fire School, New Haven, CT. For further information, contact: State Fire Administrator, Commission on Fire Prevention and Control, 294 Colony Street, Meriden, CT 06450.

January 14-29. Fire Service Instructor I, Connecticut State Fire School, Fairfield, CT. For further information, contact: State Fire Administrator, Commission on Fire Prevention and Control, 294 Colony Street, Meriden, CT 06450.

January 14-15. Basic Recognition of Hazardous Materials, Connecticut State Fire School, Preston, CT. For further information, contact: State Fire Administrator, Commission on Fire Prevention and Control, 294 Colony Street, Meriden, CT 06450.

January 15. Florida Fire Department Training Improvement Conference, Ramada Inn, Ocala, FL. Fee: $35. For further information, contact: Fred Stark, Chief, Bureau of Fire Standards and Training, 1501 SW Broadway, Ocala, FL 32675. (904) 732-0526.

January 18-20. NFPA Standards Council Meeting, Key Biscayne, FL. For further information, contact: Leona Taraskiewicz, National Fire Protection Association, Batterymarch Park, Quincy, MA 02269. (617) 770-3000.

January 19. Rhode Island Association of Fire Chiefs Monthly Meeting. For further information, contact: Chief Ernest Civrilli, East Providence Fire Department, 913 Broadway, E. Providence, RI 02914.

January 19-21. Fire Districts Association of California Annual Conference, Sacramento, CA. For further information, contact: California Fire Chiefs Association, 1400 K Street, Suite 303, Sacramento, CA 95814. (916) 441-0371.

January 28-29. Hazardous Materials Incident Analysis, National Fire Academy Weekend Course, Emmitsburg, MD. For further information, contact: Office of Admissions and Registration, National Emergency Training Center, 16825 South Seton Avenue, Emmitsburg, MD 21727.

February
Nevada Chapter, IAAI Monthly Meeting. For further information, contact: Deputy State Fire Marshal Jack Davis, Capitol Complex, Carson City, NV 89710.

Northern Nevada Fire Marshals Monthly Meeting. For further information, contact: Secretary/Treasurer Paul Huss, State Fire Marshal Division, Capitol Complex, Carson City, NV 89710.

North Carolina Fire Education Conference, Greensboro, NC. For further information, contact: Cathy Lohr, Fire Education Specialist, NC Department of Insurance, P.O. Box 26387, Raleigh, NC 27611. (919) 733-2142.

Southern Nevada Regional Arson Task Force Meeting. For further information, contact: President Mike Patterson, 2626 East Carey Avenue, North Las Vegas, NV 89030.

February 4-5. Basic Recognition of Hazardous Materials, Connecticut State Fire School, Willimantic, CT. For further information, contact: State Fire Administrator, Commission on Fire Prevention and Control, 294 Colony Street, Meriden, CT 06450.

February 4-5. Fire Service Supervision, National Fire Academy Weekend Course, Emmitsburg, MD. For further information, contact: Office of Admissions and Registration, National Emergency Training Center, 16825 South Seton Avenue, Emmitsburg, MD 21727.

February 8-9. Sprinklers, Connecticut State Fire School, Milford, CT. For further information, contact: State Fire Administrator, Commission on Fire Prevention and Control, 294 Colony Street, Meriden, CT 06450.

February 11-12. Operational Risk, Connecticut State Fire School, Windsor Locks, CT. For further information, contact: State Fire Administrator, Commission on Fire Prevention and Control, 294 Colony Street, Meriden, CT 06450.

February 11-12. Hazardous Materials II, Connecticut State Fire School, Danbury, CT. For further information, contact: State Fire Administrator, Commission on Fire Prevention and Control, 294 Colony Street, Meriden, CT 06450.

February 11 and 26. Tactics, Connecticut State Fire School, South Windsor, CT. For further information, contact: State Fire Administrator, Commission on Fire Prevention and Control, 294 Colony Street, Meriden, CT 06450.

February 16. Rhode Island Association of Fire Chiefs Monthly Meeting. For further information, contact: Chief Ernest Civrilli, East Providence Fire Department, 913 Broadway, E. Providence, RI 02914.

February 18-19. Firefighting Risk Analysis: A Systems Approach, National Fire Academy Weekend Course, Emmitsburg, MD. For further information, contact: Office of Admissions and Registration, National Emergency Training Center, 16825 South Seton Avenue, Emmitsburg, MD 21727.

February 18-26. Fire Service Instructor II, Connecticut State Fire School, Fairfield, CT. For further information, contact: State Fire Administrator, Commission on Fire Prevention and Control, 294 Colony Street, Meriden, CT 06450.

February 22-23. Hazardous Materials II, Connecticut State Fire School, Branford, CT. For further information, contact: State Fire Administrator, Commission on Fire Prevention and Control, 294 Colony Street, Meriden, CT 06450.

February 25-26. National Fire Academy State Weekend Program (Maryland). For further information, contact: John W. Hoglund, Maryland Fire and Rescue, University of Maryland, College Park, MD 20742. (301) 454-2416 or (301) 577-5855.

February 26-March 10. South African Fire Service Institute, Windhok, South Africa. For further information, contact: David Gratz, Director of International Relations, National Fire Protection Association, 600 Maryland Avenue SW, Suite 220, Washington, DC 20024. (202) 484-8200.

March
Mountain Rescue, North Carolina Forest Service, Stone Mountain State Park, Corpening Training Facility, Crossnore, NC. For further information, contact: Division of Forest Resources, Department of Natural Resources and Community Development, P.O. Box 27687, Raleigh, NC 27611.

Nevada Chapter, IAAI Monthly Meeting. For further information, contact: Deputy State Fire Marshal Jack Davis, Capitol Complex, Carson City, NV 89710.

Northern Nevada Fire Marshals Monthly Meeting. For further information, contact: Secretary/Treasurer Paul Huss, State Fire Marshal Division, Capitol Complex, Carson City, NV 89710.

Southern Nevada Regional Arson Task Force Meeting. For further information, contact: President Mike Patterson, 2626 East Carey Avenue, North Las Vegas, NV 89030.

March 3-4. Public Fire Education Planning, Connecticut State Fire School, South Windsor, CT. For further information, contact: State Fire Administrator, Commission on Fire Prevention and Control, 294 Colony Street, Meriden, CT 06450.

March 3-4. Fire Service Supervision: Increasing Team Effectiveness, National Fire Academy Weekend Course, Emmitsburg, MD. For further information, contact: Office of Admissions and Registration, National Emergency Training Center, 16825 South Seton Avenue, Emmitsburg, MD 21727.

March 3-18. Fire Service Instructor I, Connecticut State Fire School, Burrville, CT. For further information, contact: State Fire Administrator, Commission on Fire Prevention and Control, 294 Colony Street, Meriden, CT 06450.

March 7-8. Instructional Techniques for Company Officers, Connecticut State Fire School, New Haven, CT. For further information, contact: State Fire Administrator, Commission on Fire Prevention and Control, 294 Colony Street, Meriden, CT 06450.

March 10-11. Effective Rural Water Supply I, Connecticut State Fire School, East Haddam, CT. For further information, contact: State Fire Administrator, Commission on Fire Prevention and Control, 294 Colony Street, Meriden, CT 06450.

March 10-June 10. Firefighter I, Connecticut State Fire School, Burrville, CT. For further information, contact: State Fire Administrator, Commission on Fire Prevention and Control, 294 Colony Street, Meriden, CT 06450.

March 10-June 10. Firefighter II, Connecticut State Fire School, Norwich, CT area. For further information, contact: State Fire Administrator, Commission on Fire Prevention and Control, 294 Colony Street, Meriden, CT 06450.

March 12-14. Fire Protection Concepts Conference, Zurich, Switzerland. For further information, contact: David Gratz, Director of International Relations, National Fire Protection Association, 600 Maryland Avenue SW, Suite 220, Washington, DC 20024. (202) 484-8200.

March 14-15. Public Fire Education Planning, Connecticut State Fire School, West Haven, CT. For further information, contact: State Fire Administrator, Commission on Fire Prevention and Control, 294 Colony Street, Meriden, CT 06450.

March 15. Rhode Island Association of Fire Chiefs Monthly Meeting. For further information, contact: Chief Ernest Civrilli, East Providence Fire Department, 913 Broadway, E. Providence, RI 02914.

March 17-18. Incident Command System and Structural Firefighting, National Fire Academy Weekend Course, Emmitsburg, MD. For further information, contact: Office of Admissions and Registration, National Emergency Training Center, 16825 South Seton Avenue, Emmitsburg, MD 21727.

March 18-22. Fire Department Instructors Conference (FDIC), Cincinnati, Ohio. For further information, contact: International Society of Fire Service Instructors, 20 Main Street, Ashland, MA 01721. (617) 881-5600.

March 24-25. Basic Recognition of Hazardous Materials, Connecticut State Fire School, Danbury, CT. For further information, contact: State Fire Administrator, Commission on Fire Prevention and Control, 294 Colony Street, Meriden, CT 06450.

March 24-25. Community Fire Defenses: Challenges and Solutions, National Fire Academy Weekend Course, Emmitsburg, MD. For further information, contact: Office of Admissions and Registration, National Emergency Training Center, Emmitsburg, MD 21727.

March 28-30. Fire Retardant Chemicals Association, Pine Mountain, GA. For further information, contact: FRCA, 265 Post Road, P.O. Box 913, Westport, CT 06881.

March 31-April 1. National Fire Academy State Weekend Program (New Jersey). For further information, contact: New Jersey State Safety Council, 50 Park Place, Room 820, Newark, NJ 07102. (201) 642-3123.

April

Nevada Chapter, IAAI Monthly Meeting. For further information, contact: Deputy State Fire Marshal Jack Davis, Capitol Complex, Carson City, NV 89710.

North Carolina Rescue Competition Seminar, Durham Public Service Academy, Durham, NC. For further information, contact: Cathy Lohr, Fire Education Specialist, NC Department of Insurance, P.O. Box 26387, Raleigh, NC 27611. (919) 733-2142.

Northern Nevada Fire Marshals Monthly Meeting. For further information, contact: Secretary/Treasurer Paul Huss, State Fire Marshal Division, Capitol Complex, Carson City, NV 89710.

Southern Nevada Regional Arson Task Force Meeting. For further information, contact: President Mike Patterson, 2626 East Carey Avenue, North Las Vegas, NV 89030.

April 4-5. Incident Command, Connecticut State Fire School, Hartford, CT. For further information, contact: State Fire Administrator, Commission on Fire Prevention and Control, 294 Colony Street, Meriden, CT 06450.

April 7-8. Volunteer Fire Service Management, Connecticut State Fire School, Windsor Locks, CT. For further information, contact: State Fire Administrator, Commission on Fire Prevention and Control, 294 Colony Street, Meriden, CT 06450.

April 9-12. Seventh Annual National Conference on Prevention, Behavior, Clean-up Spills, and Waste Sites. For further information, contact: 1984 Hazardous Materials Spill Conference, 1629 K Street, Suite 700, Washington, DC 20006.

April 9-13. "LIFE '84" — London International Fire Exhibition, Olympia (exhibition complex), London, England. Sponsor: Council of British Fire Protection Equipment Manufacturers. For further information, contact: Victor Green Publications, Ltd., Cavendish House, 128/134 Cleveland Street, London W1P 5DN, England, Telex 8811108.

April 11-13. NFPA Standards Council Meeting, San Diego, CA. For further information, contact: Leona Taraskiewicz, National Fire Protection Association, Batterymarch Park, Quincy, MA 02269. (617) 770-3000.

April 18-26. Fire Service Instructor II, Connecticut State Fire School, Meriden, CT. For further information, contact: State Fire Administrator, Commission on Fire Prevention and Control, 294 Colony Street, Meriden, CT 06450.

April 19. Rhode Island Association of Fire Chiefs Monthly Meeting. For further information, contact: Chief Ernest Civrilli, East Providence Fire Department, 913 Broadway, E. Providence, RI 02914.

April 28-29. Effective Rural Water Supply II, Connecticut State Fire School, Bethany, CT. For further information, contact: State Fire Administrator, Commission on Fire Prevention and Control, 294 Colony Street, Meriden, CT 06450.

May

Nevada Chapter, IAAI Monthly Meeting. For further information, contact: Deputy State Fire Marshal Jack Davis, Capitol Complex, Carson City, NV 89710.

Northern Nevada Fire Marshals Monthly Meeting. For further information, contact: Secretary/Treasurer Paul Huss, State Fire Marshal Division, Capitol Complex, Carson City, NV 89710.

Southern Nevada Regional Arson Task Force Meeting. For further information, contact: President Mike Patterson, 2626 East Carey Avenue, North Las Vegas, NV 89030.

May 5-June 3. Pumps, Connecticut State Fire School, Branford, CT. For further information, contact: State Fire Administrator, Commission on Fire Prevention and Control, 294 Colony Street, Meriden, CT 06450.

May 6-10. California Fire Chiefs Association Annual Conference, Riviera Hotel, Palm Springs, CA. For further information, contact: California Fire Chiefs Association, 1400 K Street, Suite 303, Sacramento, CA 95814. (916) 441-0371.

May 17. Rhode Island Association of Fire Chiefs Monthly Meeting. For further information, contact: Chief Ernest Civrilli, East Providence Fire Department, 913 Broadway, E. Providence, RI 02914.

May 19-20. Vehicle Rescue, Connecticut State Fire School, Wolcott, CT. For further information, contact: State Fire Administrator, Commission on Fire Prevention and Control, 294 Colony Street, Meriden, CT 06450.

May 21-24. National Fire Protection Association 88th Annual Meeting and Fire Safety Exhibit, New Orleans, LA. For further information, contact: Meetings Department, National Fire Protection Association, Batterymarch Park, Quincy, MA 02269. (617) 770-3000.

May 21-25. Fire International '84 Conference and Exposition, Birmingham, England. For further information, contact: Danny Thomas, Fire International '84, Queensway House, 2 Queensway, Redhill, Surrey RI 1QS, England.

June

Florida State Firemen's Association Annual Conference. Fee: $35. For further information, contact: Florida State Firemen's Association, P.O. Box 968, Avon Park, FL 33825. (813) 453-4817.

Nevada Chapter, IAAI Monthly Meeting. For further information, contact: Deputy State Fire Marshal Jack Davis, Capitol Complex, Carson City, NV 89710.

North Carolina Rescue Institute, University of North Carolina, Chapel Hill, NC. For further information, contact: Cathy Lohr, Fire Education Specialist, NC Department of Insurance, P.O. Box 26387, Raleigh, NC 27611. (919) 733-2142.

Northern Nevada Fire Marshals Monthly Meeting. For further information, contact: Secretary/Treasurer Paul Huss, State Fire Marshal Division, Capitol Complex, Carson City, NV 89710.

Southern Nevada Regional Arson Task Force Meeting. For further information, contact: President Mike Patterson, 2626 East Carey Avenue, North Las Vegas, NV 89030.

June 2-3. Vehicle Rescue, Connecticut State Fire School, New Fairfield, CT. For further information, contact: State Fire Administrator, Commission on Fire Prevention and Control, 294 Colony Street, Meriden, CT 06450.

June 2-3. National Fire Academy State Weekend Program (Pennsylvania). For further information, contact: Robert C. Grening, Pennsylvania State Fire Training, P.O. Box 631, Lewistown, PA 17044. (717) 248-1115 or (717) 436-8136.

June 9-10. Fire/Arson Detection, Connecticut State Fire School, Danbury, CT. For further information, contact: State Fire Administrator, Commission on Fire Prevention and Control, 294 Colony Street, Meriden, CT 06450.

June 18-22. Idaho State Fire School, Idaho Falls, ID. For further information, contact: Tom Tyree, Fire Service Training, P.O. Box 1238, Twin Falls, ID 83301. (208) 733-9554.

June 21. Rhode Island Association of Fire Chiefs Monthly Meeting. For further information, contact: Chief Ernest Civrilli, East Providence Fire Department, 913 Broadway, E. Providence, RI 02914.

June 21-24. Nevada State Firemen's and Nevada Fire Chiefs Associations Joint Training Conference, Herington, NV. For further information, contact: William Southard, Chief, Herington Fire Department, Herington, NV 89447.

June 23. Idaho Fire Chiefs Association, Twin Falls, ID. For further information, contact: Chief Bobby K. Bopp, Twin Falls Fire Department, Twin Falls, ID 83301. (208) 733-3146.

July

Nevada Chapter, IAAI Monthly Meeting. For further information, contact: Deputy State Fire Marshal Jack Davis, Capitol Complex, Carson City, NV 89710.

North Carolina Rescue College, Durham Public Training Academy, Durham, NC. For further information, contact: Cathy Lohr, Fire Education Specialist, NC Department of Insurance, P.O. Box 26387, Raleigh, NC 27611. (919) 733-2142.

Northern Nevada Fire Marshals Monthly Meeting. For further information, contact: Secretary/Treasurer Paul Huss, State Fire Marshal Division, Capitol Complex, Carson City, NV 89710.

Southern Nevada Regional Arson Task Force Meeting. For further information, contact: President Mike Patterson, 2626 East Carey Avenue, North Las Vegas, NV 89030.

July 11-14. 31st Annual Convention, International Fire Buffs Association, Mariott-Long Wharf Hotel, Boston, MA. Fee: $80 before May 1; $95 after May 1. For further information, contact: BIFBAC II, P.O. Box 6238, Boston, MA 02150-6238.

July 14. Pennsylvania Pump Primers Muster, River Park, Harrisburg, PA. For further information, contact: Elois D. Cocklin, Secretary, P.O. Box 3785, Harrisburg, PA 17105. (717) 652-6818.

July 16. Florida Fire Chiefs Association Annual Conference. Fee: $30. For further information, contact: Larry Joyce, FFCA President, North Palm Beach Fire Department, 501 U.S. No. 1, North Palm Beach, FL 33408.

July 19. Rhode Island Association of Fire Chiefs Monthly Meeting. For further information, contact: Chief Ernest Civrilli, East Providence Fire Department, 913 Broadway, E. Providence, RI 02914.

July 21-22. National Fire Academy State Weekend Program (Connecticut). For further information, contact: State Fire Administrator, Commission on Fire Prevention and Control, 294 Colony Street, Meriden, CT 06450.

July 28-29. Building Construction for Fire Suppression Forces: Principles, Wood and Ordinary Construction, National Fire Academy Weekend Course, Emmitsburg, MD. For further information, contact: Office of Admissions and Registration, National Emergency Training Center, 16825 South Seton Avenue, Emmitsburg, MD 21727.

August

Comstock Muster and Competition. For further information, contact: Liberty Engine Company Number 1, P.O. Box 466, Virginia City, NV 89440.

Nevada Chapter, IAAI Monthly Meeting. For further information, contact: Deputy State Fire Marshal Jack Davis, Capitol Complex, Carson City, NV 89710.

North Carolina Rescue Judge's School, Durham Public Training Academy, Durham, NC. For further information, contact: Cathy Lohr, Fire Education Specialist, NC Department of Insurance, P.O. Box 26387, Raleigh, NC 27611. (919) 733-2142.

Northern Nevada Fire Marshals Monthly Meeting. For further information, contact: Secretary/Treasurer Paul Huss, State Fire Marshal Division, Capitol Complex, Carson City, NV 89710.

Southern Nevada Regional Arson Task Force Meeting. For further information, contact: President Mike Patterson, 2626 East Carey Avenue, North Las Vegas, NV 89030.

August 16. Rhode Island Association of Fire Chiefs Monthly Meeting. For further information, contact: Chief Ernest Civrilli, East Providence Fire Department, 913 Broadway, E. Providence, RI 02914.

August 18-19. Building Construction for Fire Suppression Forces: Non-combustible and Fire-resistive Construction, National Fire Academy Weekend Course, Emmitsburg, MD. For further information, contact: Office of Admissions and Registration, National Emergency Training Center, 16825 South Seton Avenue, Emmitsburg, MD 21727.

September

Idaho Command School, Idaho State University, Pocatello, ID. For further information, contact: Tom Tyree, Fire Service Training, P.O. Box 1238, Twin Falls, ID 83301. (208) 733-9554.

Nevada Chapter, IAAI Monthly Meeting. For further information, contact: Deputy State Fire Marshal Jack Davis, Capitol Complex, Carson City, NV 89710.

North Carolina Rescue Competition Seminar, Durham Public Safety Academy, Durham, NC. For further information, contact: Cathy Lohr, Fire Education Specialist, NC Department of Insurance, P.O. Box 26387, Raleigh, NC 27611. (919) 733-2142.

Northern Nevada Fire Marshals Monthly Meeting. For further information, contact: Secretary/Treasurer Paul Huss, State Fire Marshal Division, Capitol Complex, Carson City, NV 89710.

Southern Nevada Regional Arson Task Force Meeting. For further information, contact: President Mike Patterson, 2626 East Carey Avenue, North Las Vegas, NV 89030.

September 20. Rhode Island Association of Fire Chiefs Monthly Meeting. For further information, contact: Chief Ernest Civrilli, East Providence Fire Department, 913 Broadway, E. Providence, RI 02914.

September 29-30. National Fire Academy State Weekend Program (Virginia). For further information, contact: Director, Department of Fire Programs, 2720 Enterprise Parkway, Room 106, Richmond, VA 23229. (804) 281-9441.

September 30-October 3. International Association of Fire Chiefs Annual Conference, Los Angeles, CA. For further information, contact: International Association of Fire Chiefs, 1329 18th Street, NW, Washington, D.C. 20036. (202) 833-3420.

October

Florida State-wide Fire Prevention Conference. Fee: $45. For further information, contact: D. R. "Buddy" DeWar, Director, Division of State Fire Marshal, Larson Building, Room 471, Tallahassee, FL 32301. (904) 488-8268.

Hawkeye Fire Safety Association. For further information, contact: Office of State Fire Marshal, State Office Building, 523 E. 12th Street, Des Moines, IA 50319. (515) 281-5821.

Nevada Chapter, IAAI Monthly Meeting. For further information, contact: Deputy State Fire Marshal Jack Davis, Capitol Complex, Carson City, NV 89710.

Northern Nevada Fire Marshals Monthly Meeting. For further information, contact: Secretary/Treasurer Paul Huss, State Fire Marshal Division, Capitol Complex, Carson City, NV 89710.

Southern Nevada Regional Arson Task Force Meeting. For further information, contact: President Mike Patterson, 2626 East Carey Avenue, North Las Vegas, NV 89030.

Statewide Pump School, Durham Public Training Academy, Durham, NC. For further information, contact: Cathy Lohr, Fire Education Specialist, NC Department of Insurance, P.O. Box 26387, Raleigh, NC 27611. (919) 733-2142.

October 7-13. Fire Prevention Week. For further information, contact: Public Education Department, National Fire Protection Association, Batterymarch Park, Quincy, MA 02269. (617) 770-3000.

October 18. Rhode Island Association of Fire Chiefs Monthly Meeting. For further information, contact: Chief Ernest Civrilli, East Providence Fire Department, 913 Broadway, E. Providence, RI 02914.

November

Breathing Equipment School, Durham Public Training Academy, Durham, NC. For further information, contact: Cathy Lohr, Fire Education Specialist, NC Department of Insurance, P.O. Box 26387, Raleigh, NC 27611. (919) 733-2142.

International Fire Chiefs Association of Asia. Manila, Philippines. For further information, contact: David Gratz, Director of International Relations, National Fire Protection Association, 600 Maryland Avenue SW, Suite 220, Washington, DC 20024. (202) 484-8200.

Nevada Chapter, IAAI Monthly Meeting. For further information, contact: Deputy State Fire Marshal Jack Davis, Capitol Complex, Carson City, NV 89710.

Northern Nevada Fire Marshals Monthly Meeting. For further information, contact: Secretary/Treasurer Paul Huss, State Fire Marshal Division, Capitol Complex, Carson City, NV 89710.

Southern Nevada Regional Arson Task Force Meeting. For further information, contact: President Mike Patterson, 2626 East Carey Avenue, North Las Vegas, NV 89030.

November 12-15. National Fire Protection Association Fall Meeting, San Diego, CA. For further information, contact: Meetings Department, National Fire Protection Association, Batterymarch Park, Quincy, MA 02269. (617) 770-3000.

November 15. Rhode Island Association of Fire Chiefs Monthly Meeting. For further information, contact: Chief Ernest Civrilli, East Providence Fire Department, 913 Broadway, E. Providence, RI 02914.

December

Nevada Chapter, IAAI Monthly Meeting. For further information, contact: Deputy State Fire Marshal Jack Davis, Capitol Complex, Carson City, NV 89710.

Northern Nevada Fire Marshals Monthly Meeting. For further information, contact: Secretary/Treasurer Paul Huss, State Fire Marshal Division, Capitol Complex, Carson City, NV 89710.

Southern Nevada Regional Arson Task Force Meeting. For further information, contact: President Mike Patterson, 2626 East Carey Avenue, North Las Vegas, NV 89030.

December 20. Rhode Island Association of Fire Chiefs Monthly Meeting. For further information, contact: Chief Ernest Civrilli, East Providence Fire Department, 913 Broadway, E. Providence, RI 02914.

Note

The National Fire Protection Association, Division for Continuing Education, will conduct seminars and workshops during 1984 on the following topics:

Open Registration Programs
Life Safety Code® Seminars (1981 edition)
National Electrical Code® Workshops (updated)
Managing Fire Safety in Health Care Facilities
Contracted Programs
Life Safety Code Seminars (1981 edition)
National Electrical Code Workshops (updated)
National Electrical Code Changes Seminars
Managing Fire Safety in Health Care Facilities
Prison Fire Safety Seminars

For the 1984 schedule and registration forms, please contact the NFPA Division for Continuing Education at (617) 770-3000, Ext. 521.

1984 Calendar/Arson Seminars

February

9th Annual Kansas Chapter Arson Seminar
Feb. 15, 16, 17, 1984
Topeka, KS
Reg. fee: $35
To register/more information: Paul Markley, Chief, Fire Prevention Division, 503 Kansas St., Suite 303, Topeka, KS 66603; 913/296-3401.

March

Texas Annual Arson Seminar
March 12-16, 1984
Austin, TX, Villa Capri Motor Hotel Convention Center
(36 hour seminar)
Reg. fee: $125, includes all materials, banquet ticket
To register/more information: John R. Rauch, Training Specialist, Fire Protection Training Division, Texas A&M University, F.E. Drawer K, College Station, TX 77843; 409/845-7641.
1985 dates: first full week in March

May

International Association of Arson Investigators Annual Seminar
April 29-May 4, 1984
Sheraton Sand Key Resort, Clearwater Beach, FL
Reg. fee: $125
To register/more information: Bill Buckley, Tampa, FL; 813/223-8201.
1985: Vancouver, British Columbia, Canada
1986: Albuquerque, NM

June

Pennsylvania Association of Arson Investigators
June 4-8, 1984
Pennsylvania University, University Park, PA
Reg. fee: not yet set
To register/more information: Mary Lou Cypher, P.O. Box 236, Saxonburg, PA 16056; 412/352-4101.

Arson for Profit
Second week of June 1984 (M-F)
West Haven, CT
Reg. fee: $125 non-credit. Call for credit rate.
To register/more information: Fred Mercilliott, Director of Fire Science, University of New Haven, West Haven, CT 06516; 203/934-6321, x 477
1985 dates: June 1985

Arson and Fire Investigation Conference
June 1984
New Brunswick, NJ
Reg. fee: $260 (approx.), includes room/board, tuition, materials, banquet
To register/more information: William G. Rae, Extension Specialist, Dept. of Government Services, Building 4053, Kilmer Campus, Rutgers University, New Brunswick, NJ 08903; 201/932-3640.
Also offer 1 week residential program; 4 night courses (2 per semester, not yet set).

July

Virginia State Arson Investigation School
Tentative: late July, early August 1984
Williamsburg, VA
Reg. fee: $65
To register/more information: W.R. Wetherington, Asst. Director, Bureau of Criminal Investigation, Virginia State Police, P.O. Box 27472, Richmond, VA 23261-7472; 804/323-2053.

August

Ohio Arson School Inc.
August 6-10, 1984
Columbus, OH
Reg. fee: $125 (room/board not included)
To register/more information: Chief Marvin Olney, Perry Township Division of Fire, 7125 Sawmill Rd., Dublin, OH 43017; 614/889-5859.
1985 date: August 5-9, 1985.

20th Annual Southeastern Arson Seminar
August 26-31, 1984
Center for Continuing Education, University of Georgia, Athens, GA
Reg. fee: ($80 in 1983)
To register: Margaret Morris, Conference Facilitator for Governmental Training Division, Georgia Center for Continuing Education, University of Georgia, Athens, GA 30602; 404/542-1328.

September

Nebraska State Fire and Arson Investigation Conference
Usually September
Holiday Inn
Hastings, NB
Reg. fee: approx. $75
To register/more information: Bill Meehan, Program Supervisor, Fire Protection Technology, Southeast Community College, Lincoln Campus, 8800 "O" St., Lincoln, NE 68520; 402/471-3333.

New Mexico Fire and Arson Seminar
September 1984
Location to be announced
Reg. fee: $95 pre-reg./$110 door (tentative)
To register/more information: Charles Ray, 1983 President NM Chapter IAAI, P.O. Box 12072, Albuquerque, NM; 505/265-6601.

Florida Annual Arson Seminar
September 1984
Reg. fee: $45
For further information: D.R. "Buddy" DeWar, Director, Division of State Fire Marshal, Larson Bldg., Rm. 471, Tallahassee, FL 32301; 904/488-8268

October

Nevada Arson Seminar
October 21-26, 1984
Location not yet set
Reg. fee: $125 for 5 days
To register/more information: Capt. Robert James, Clark County Fire Dept., 707 E. Desert Inn Rd., Las Vegas, NV 89109; 702/876-2698.

Oklahoma Fire and Arson Investigators Conference
October 24-26, 1984
Reg. fee: $45 pre-reg./$55 at door
To register/more information: Clifford Lewis, Secretary-Treasurer, IAAI, 315 W. Hurd, Edmond, OK 73034; 405/235-9188.

Oklahoma State University co-sponsors above seminar. OSU also offers a 12-hr. (thru yr) program in basic cause determination (*Fire and Arson Detection*) in conjunction with the National Fire Academy (no NFA certification awarded). For this, contact Jack Gardner, Field Instructor, Oklahoma State University, Stillwater, OK; 405/624-5727.

November

Idaho Fire and Arson Investigators Association
For further information: Tom Tyree, Fire Service Training, P.O. Box 1238, Twin Falls, ID 83301; 208/733-9554.

9th Annual Fire And Arson Conference
November 1984
Hempstead, NY
To register/more information: Dr. Ronald J. Alvarez, Director of Continuing Engineering Education, Hofstra University, Adams Hall, Room 121, Hempstead, NY 11550; 516/560-5548.

1984 Calendar / National Fire Academy Resident Programs

About the National Fire Academy Resident Programs

Courses of the National Fire Academy Resident Program are held at the Academy's campus in Emmitsburg, MD. Classes are scheduled from October to October each year; a class schedule for October 1984 to October 1985 will be available from the National Fire Academy in mid-1984.

Application forms are available from the National Fire Academy, from FEMA regional offices, state fire service training directors, and many metropolitan fire departments. For specific application instructions, write the National Fire Academy Office of Admissions, 16825 S. Seton Ave., Emmitsburg, MD 21727 or call (301) 447-6771 or (800) 638-9600. Brief course descriptions and a schedule of when courses will be offered in 1984 are listed below.

Education Courses

Educational Methodologies A two-week, two-phase instructor development course designed to prepare fire and rescue personnel as instructors. The first phase provides specific information about audience needs, performance objectives, teaching strategies, instructional aids and media, lesson planning, and testing. Students engage in applied performance activities to demonstrate their understanding of each concept. The second phase requires the student to design instructional approaches, create instructional materials, and actively demonstrate three prescribed training deliveries for peer and instructor evaluation. This provides students with opportunities to refine the techniques they will apply as trainers.

Course Development A two-week course designed to teach training personnel how to design and develop courses and implement education and training programs. The program identifies the components of a typical course development process and teaches trainers how to plan, research, write, and evaluate a training program. Media production techniques also are discussed. Students partially develop a course of instruction.

Management and Public Fire Education A two-week course designed for individuals in charge of an organization's public education function. The course will help students make their public education programs more efficient and effective. The two main subject areas are management skills and educational technology skills.

Management Technology Courses

Use of Microcomputers for Fire Service Management A comprehensive two-week program designed to support the use of low-cost computers as a fire management resource. Program topics include: organizational analysis; analysis of information requirements; organizational issues associated with fire service data processing; purchasing microcomputer systems; use of hardware; and formatting commercial software for fire service use. Students have an opportunity for extensive hands-on experience in the Academy's computer laboratory.

Information Management in the Fire Service A two-week course designed to provide fire service managers with a background to multi-user computer systems and effective management of computerized information systems. The course is roughly divided between management curriculum and application of information technology using a multi-user computer in a laboratory.

Management of Emergency Medical Services for the Fire Service A two-week course designed for fire service managers who are beginning an EMS service or are considering upgrading an existing service. The course is designed to provide systematic approaches for the management of FS/EMS. Specific topics include: resources and constraints to system development; impact of EMS on capital and operating costs of the fire department; mechanisms for medical control and quality assurance; sources of financial support; and evaluation of FS/EMS delivery systems using low-cost microcomputers.

Executive Development Courses

Executive Development III An intensive two-week program for top-level fire officers which provides an opportunity to expand their managerial approaches and improve organizational effectiveness. The focus of the program is on future challenges which will have an impact on the changing role of fire executives; the goal is to encourage proactive management in fire service organizations.

Fire Service Leadership/Communications A three-week course designed to enhance a mid-level manager's skills in leadership, supervision, and communication: Week 1 — Leadership Training; Week 2 — Written Communication; Week 3 — Oral Communication.

Fire Service Organizational Theory A two-week overview of broad management theory and its practical application to fire service organizations. Participants trace the evolution of management theory and examine the implications for fire service managers. Analytical tools and skills are applied in workshop exercises, case studies, and force-field analysis.

Interpersonal Dynamics in Fire Service Organizations A two-week course designed to help fire service managers understand the dynamics of human behavior within an organizational environment. Participants begin with a critical self-assessment of their individual managerial strengths and weaknesses which results in a specific plan for their own professional development. Techniques for creating effective organizational environments are defined. Components of a successful human resource development plan are examined.

Arson Courses

Fire Arson Invesigation A three-week course designed for personnel whose primary responsibility is the investigation of fire-related incidents. Defines successful methods for conducting legal fire investigations which culminate in prosecution for arson. Classroom instruction is enhanced by actual burn scene examination and case development in the Academy's Arson Fire Scene Laboratory.

Hazardous Materials Courses

Chemistry of Hazardous Materials A two-week course that provides the basic knowledge required to evaluate the potential hazards and behaviors of materials considered to be hazardous. Directed at the underlying reasons for the chemical behavior of hazardous materials, the course is designed to improve decision-making, safety operations, and handling. The course is heavily chemistry-oriented.

Hazardous Materials Tactical Considerations A two-week course which identifies the safe procedures and tactics for alleviating the danger from a hazardous materials incident. Subjects covered include hazardous materials response team organization and equipment, hazard recognition, analytical instruments, classes of hazardous materials, protective clothing, and breathing apparatus.

Planning for a Hazardous Materials Incident A two-week course that presents formats, methods, and techniques used in planning, and attempts to develop the student's ability to prepare a comprehensive plan encompassing all involved agencies.

Community Resource Preservation Courses

Fire Prevention Specialist I A two-week program designed to improve the professional development of fire inspectors. The course provides a solid, technical background for conducting official fire inspections. Areas of study include law, code enforcement, prevention analysis, inspection competencies, life safety, hazardous materials, electrical and heating systems.

Fire Prevention Specialist I/Fire Arson Detection A three-week sequence linking two courses of interest to the Fire Prevention Specialist. Applicants are required to take the entire three-week sequence: Fire Prevention Specialist I (same as above), and Fire/Arson Detection designed to identify effective methods of arson detection. (This course is not designed to fill the more advanced needs of the fire investigator.)

Fire Prevention Specialist II A two-week course designed to meet the professional development needs of the advanced fire prevention officer. This course addresses plans review, recordkeeping, interpersonal communications, code interpretation, fire protection systems, special assignments, and firesafety evacuation planning.

Managing the Code Process A two-week course designed for personnel responsible for the code process in their community, including adoption, change, revision, administration, application, and enforcement.

Plans Review for Inspectors A two-week course designed to provide the participant with a systematic approach to verify that a complete set of construction documents complies with applicable codes. Participants also learn how to verify that sprinkler, standpipe, fire alarm and detection system, and fire pump installations are designed in compliance with applicable standards. The course covers the development of a plan review system and special tasks which the plan reviewer may be expected to perform.

Emergency Incident Policy and Analysis Courses

Incident Command A two-week course designed to give the student an awareness of problems presented by various fire and emergency situations (primarily in the structual environment). It offers a systematic process of resource management involving the first alarm assignment, with emphasis placed on strategy, tactics, pre-fire planning, and personnel safety.

Incident Command/Fire Arson Detection A three-week sequence linking two courses of interest to the Incident Commander. Applicants are required to take the entire three-week sequence: Incident Command (as described above), and Fire/Arson Detection designed to identify effective methods of arson detection. (This course is not designed to fill the more advanced needs of the fire investigator. It is intended for fire officers and senior fire fighters.)

Advanced Incident Command A two-week course designed for fireground managers whose duties include planning for and commanding large-scale, complex, and lengthy operations. The course covers a system of incident command particularly adaptable to providing orderly management at large operations. It delineates both line and staff functions and responsibilities. Analyses of various fire situations are studied as an aid to more effective decision-making. Case studies of unusual and significant incidents are an integral part of the course.

Strategic Considerations of Special Fire Problems A two-week course which uses a case study approach to large-loss fires. It is designed for senior level fireground managers who review and evaluate actual incidents in order to formulate more effective and efficient strategies. The cases to be analyzed are drawn from a wide variety of incidents and situations faced in the field.

January
January 9-20. The Chemistry of Hazardous Materials.
January 9-20. Fire Prevention Specialist II.
January 9-20. Hazardous Materials Tactical Considerations.
January 9-20. Management of Emergency Medical Services for the Fire Service.
January 9-20. Plans Review for Inspectors.
January 9-20. Use of Microcomputers for Fire Service Management.
January 9-27. Fire Arson Investigation.
January 9-27. Fire Prevention Specialist I/Fire Arson Detection.
January 9-27. Fire Service Leadership/Communications.
January 9-27. Incident Command/Fire Arson Detection.
January 23-February 3. Advanced Incident Command.
January 23-February 3. Fire Service Organizational Theory.
January 23-February 3. Management of Public Fire Education.
January 23-February 3. Managing the Code Process.
January 23-February 3. Planning for a Hazardous Materials Incident.
January 23-February 3. Strategic Considerations of Special Fire Problems.
January 30-February 10. Executive Development III.
January 30-February 10. Fire Prevention Specialist II.
January 30-February 10. Interpersonal Dynamics in Fire Service Organizations.
January 30-February 10. Use of Microcomputers for Fire Service Management.

February
February 6-17. Hazardous Materials Tactical Considerations.
February 6-17. Incident Command.
February 6-24. Fire Arson Investigation.
February 6-24. Fire Service Leadership/Communications.
February 13-24. Fire Prevention Specialist I.
February 13-24. Management of Public Fire Education.
February 20-March 2. Advanced Incident Command.
February 20-March 2. The Chemistry of Hazardous Materials.
February 20-March 2. Management of Emergency Medical Services for the Fire Service.
February 20-March 2. Plans Review for Inspectors.
February 27-March 8. Fire Service Organizational Theory.
February 27-March 9. Interpersonal Dynamics in Fire Service Organizations.
February 27-March 9. Managing the Code Process.
February 27-March 9. Use of Microcomputers for Fire Service Management.

March
March 2-23. Executive Development III.
March 5-16. Course Development.

March 5-16. Hazardous Materials Tactical Considerations.
March 5-16. Incident Command.
March 5-16. Strategic Considerations of Special Fire Problems.
March 5-23. Fire Arson Investigation.
March 12-23. Fire Prevention Specialist II.
March 12-30. Fire Prevention Specialist I/Public Fire Education.
March 19-30. Advanced Incident Command.
March 19-30. Hazardous Materials Tactical Considerations.
March 19-30. Interpersonal Dynamics in Fire Service Organizations.
March 26-April 6. Educational Methodology.
March 26-April 6. Plans Review for Inspectors.

April
April 2-13. Fire Prevention Specialist II.
April 2-13. Managing the Code Process.
April 2-13. Planning for a Hazardous Materials Incident.
April 2-20. Fire Arson Investigation.
April 2-20. Fire Service Leadership/Communications.
April 9-20. Advanced Incident Command.
April 9-20. Management of Emergency Medical Services for the Fire Service.
April 9-20. Management of Public Fire Education.
April 9-20. Strategic Considerations of Special Fire Problems.
April 30-May 11. Executive Development III.
April 30-May 11. Fire Prevention Specialist II.
April 30-May 11. Fire Service Organizational Theory.
April 30-May 11. Hazardous Materials Tactical Considerations.
April 30-May 18. Fire Arson Investigation.
April 30-May 18. Fire Incident Command/Fire Arson Detection.
April 30-May 18. Fire Prevention Specialist I/Fire Arson Detection.

May
May 14-25. Advanced Incident Command.
May 14-25. The Chemistry of Hazardous Materials.
May 14-25. Management of Public Fire Education.
May 14-25. Plans Review for Inspectors.
May 14-June 1. Fire Service Leadership/Communications.
May 21-June 1. Fire Service Organizational Theory.
May 21-June 1. Hazardous Materials Tactical Considerations.
May 21-June 1. Management of Emergency Medical Services for the Fire Service.
May 21-June 1. Use of Microcomputers for Fire Service Management.
May 28-June 8. Managing the Code Process.

June
June 4-15. Advanced Incident Command.
June 4-15. The Chemistry of Hazardous Materials.
June 4-15. Educational Methodology.
June 4-15. Information Management in the Fire Service.
June 4-15. Interpersonal Dynamics in Fire Service Organizations.
June 4-15. Plans Review for Inspectors.
June 4-15. Strategic Considerations of Special Fire Problems.
June 11-22. Executive Development III.
June 11-29. Fire Arson Investigation.
June 11-29. Fire Prevention Specialist I/Public Fire Education.
June 18-29. Course Development.

June 18-29. Fire Service Organizational Theory.
June 18-29. Hazardous Materials Tactical Considerations.
June 18-29. Incident Command.
June 18-29. Use of Microcomputers for Fire Service Management.

July
July 9-20. The Chemistry of Hazardous Materials.
July 9-20. Course Development.
July 9-20. Executive Development III.
July 9-20. Fire Prevention Specialist II.
July 9-20. Incident Command.
July 9-20. Management of Public Fire Education.
July 9-27. Fire Arson Investigation.
July 9-27. Fire Service Leadership/Communications.
July 23-August 3. Advanced Incident Command.
July 23-August 3. Educational Methodology.
July 23-August 3. Hazardous Materials Tactical Considerations.
July 23-August 3. Managing the Code Process.
July 30-August 10. Information Management in the Fire Service.
July 30-August 10. Interpersonal Dynamics in Fire Service Organizations.
July 30-August 10. Plans Review for Inspectors.
July 30-August 10. Use of Microcomputers for Fire Service Management.
July 30-August 17. Fire Prevention Specialist I/Public Fire Education.
July 30-August 17. Management of Emergency Medical Services for the Fire Service.

August
August 6-17. Advanced Incident Command.
August 6-17. Planning for a Hazardous Materials Incident.
August 13-24. Fire Service Organizational Theory.
August 13-31. Fire Arson Investigation.
August 20-31. The Chemistry of Hazardous Materials.
August 20-31. Course Development.
August 20-31. Executive Development III. August 20-31. Incident Command.
August 20-31. Information Management in the Fire Service.
August 20-31. Interpersonal Dynamics in Fire Service Organizations.
August 20-31. Plans Review for Inspectors.

September
September 10-21. Information Management in the Fire Service.
September 10-21. Management of Emergency Medical Services for the Fire Service.
September 10-21. Management of Public Fire Education.
September 10-21. Managing the Code Process.
September 10-28. Fire Arson Investigation.
September 10-28. Fire Service Leadership/Communications.
September 17-28. The Chemistry of Hazardous Materials.
September 17-28. Course Development.
September 17-28. Fire Prevention Specialist II.
September 17-28. Incident Command.

1984 Calendar/National Fire Academy Field Programs

About the National Fire Academy Field Program

In cooperation with state sponsors, the National Fire Academy sponsors "outreach" training through the Field Programs. These courses are intensive, short-term (usually 12-14 hours) training experiences normally held on weekends.

The state sponsors handle all course registration and should be contacted for additional information. (The contact follows the course listing.)

Since courses are scheduled according to the federal fiscal year, this section only lists courses to be held before Oct. 1, 1984. The National Fire Academy will issue its calendar for Oct. 1984-Oct. 1985 in mid-1984.

January

January 7-8. Fire Risk Analysis (Delaware). For further information, contact: Delaware State Fire School, R.D. 2, Box 166, Dover, DE 19901; (302) 736-4773.

January 7-8. Incident Command System and Structural Fire Fighting (Kansas). For further information, contact: Fire Service Training, Division of Continuing Education, University of Kansas, 645 New Hampshire Avenue, Lawrence, KS 60045; (913) 864-4467.

January 7-8. Incident Command System and Structural Fire Fighting (Maryland). For further information, contact: Maryland Fire and Rescue Institute, University of Maryland, College Park, MD 207421; (301) 454-2416.

January 10-11. Fire Fighting Resource Management Planning (Mississippi). For further information, contact: Mississippi Fire Academy, Route 10, Box 295, Jackson, MS 39208; (601) 932-2444.

January 13-14. EMS Administration (Texas). For further information, contact: Fire Protection Training, Texas Engineering Extension Service, Texas A & M University, FE Drawer K, College Station, TX 77843-8000; (409) 845-7641.

January 13-14. Fire Risk Analysis (Texas). For further information, contact: Fire Protection Training, Texas Engineering Extension Service, Texas A & M University, FE Drawer K, College Station, TX 77843-8000; (409) 845-7641.

January 14-15. Building Construction: Wood and Ordinary (Nevada). For further information, contact: Fire Service Training Section, State Fire Marshal Division, Capitol Complex, Carson City, NV 89710; (702) 885-4290.

January 14-15. EMS Administration (Vermont). For further information, contact: Fire Service Training Program, Vermont State Firefighters Association, P.O. Box 53, Pittsford, VT 05763; (802) 483-9407.

January 14-15. Fire Service Supervision (Kentucky). For further information, contact: Public Service Occupations Unit, Kentucky Department of Education, 21st Floor, Capital Plaza Tower, Frankfort, KY 40601; (502) 564-2326.

January 14-15. Incident Command System and Structural Fire Fighting (Kentucky). For further information, contact: Public Service Occupations Unit, Kentucky Department of Education, 21st Floor, Capital Plaza Tower, Frankfort, KY 40601; (502) 564-2326.

January 14-15. Incident Command System and Structural Fire Fighting (Maine). For further information, contact: Fire Service Training, Bureau of Vocational Education, Department of Education and Cultural Services, Station #23, Augusta, ME 04330; (207) 289-2621.

January 14-15. Interpersonal Relations for Fire Service Supervisors (California). For further information, contact: Fire Service Training and Education System, 7171 Bowling Drive, Suite 500, Sacramento, CA 95823; (916) 427-4204.

January 14-15. Interpersonal Relations for Fire Service Supervisors (Tennessee). For further information, contact: Tennessee State Fire School, 1303 Old Fort Parkway, Murfreesboro, TN 37130; (615) 893-4095.

January 14-15. Pesticide Fire and Spill Control (Kentucky). For further information, contact: Public Service Occupations Unit, Kentucky Department of Education, 21st Floor, Capital Plaza Tower, Frankfort, KY 40601; (502) 564-2326.

January 21-22. Building Construction: Wood and Ordinary (Massachusetts). For further information, contact: Massachusetts Firefighting Academy, 59 Horse Pond Road, Sudbury, MA 01776; (617) 443-8956.

January 28-29. Building Construction: Noncombustible and Fire-Resistive (Montana). For further information, contact: Montana Fire Services Training School, 2100 16th Avenue South, Great Falls, MT 59405; (406) 761-7885.

January 28-29. Building Construction: Wood and Ordinary (Kansas). For further information, contact: Fire Service Training, Division of Continuing Education, University of Kansas, 645 New Hampshire Avenue, Lawrence, KS 60045; (913) 864-4467.

February

February 4-5. Building Construction: Noncombustible and Fire-Resistive (Kansas). For further information, contact: Fire Service Training, Division of Continuing Education, University of Kansas, 645 New Hampshire Avenue, Lawrence, KS 60045; (913) 864-4467.

February 4-5. Building Construction: Noncombustible and Fire-Resistive (Nevada). For further information, contact: Fire Service Training Section, State Fire Marshal Division, Capitol Complex, Carson City, NV 89710; (702) 885-4290.

February 4-5. Building Construction: Wood and Ordinary (Maine). For further information, contact: Fire Service Training, Bureau of Vocational Education, Department of Education and Cultural Services, Station #23, Augusta, ME 04330; (207) 289-2621.

February 4-5. Building Construction: Wood and Ordinary (Missouri). For further information, contact: Missouri Fire and Rescue Training Institute, 1001 Ashland Gravel Road, Columbia, MO 65201; (314) 882-4735.

February 4-5. EMS Administration (Nebraska). For further information, contact: Nebraska Fire Service, 3721 West Cuming, Lincoln, NE 68524-1896; (402) 471-2803.

February 4-5. Fire Fighting Resource Management Planning (South Carolina). For further information, contact: South Carolina Fire Academy, State Board for Technical and Comprehensive Education, 2920 Fire Academy Road, West Columbia, SC 29169; (803) 758-8411.

February 4-5. Fire Fighting Resource Management Planning (West Virginia). For further information, contact: Fire Service Extension, West Virginia University, 313 Knapp Hall, Morgantown, WV 26506; (304) 293-2106.

February 4-5. Hazardous Materials Incident Analysis (Virginia). For further information, contact: Department of Fire Programs, Commonwealth of Virginia, 2720 Enterprise Parkway, Suite 106, Richmond, VA 23229; (804) 281-9441.

February 7-8. Pesticide Fire and Spill Control (Mississippi). For further information, contact: Mississippi Fire Academy, Route 10, Box 295, Jackson, MS 39208; (601) 932-2444.

February 11-12. Building Construction: Noncombustible and Fire-Resistive (Oklahoma). For further information, contact: Fire Service Training, Fire Building, Oklahoma State University, Stillwater, OK 74078; (405) 624-5727.

February 11-12. Incident Command and Structural Fire Fighting (Minnesota). For further information, contact: Adult Vocational Section, Minnesota Department of Education, 529 Capital Square Building, 550 Cedar Street, St. Paul, MN 55101; (612) 296-6516.

February 11-12. Interpersonal Relations for Fire Service Supervisors (Georgia). For further information, contact: Georgia Fire Academy, 1112 Clay Street, Marietta, GA 30060; (404) 424-7315.

February 13-14. Building Construction: Wood and Ordinary (Alaska). For further information, contact: Fire Service Training, Adult and Continuing Education, Pouch F, State Office Building, Juneau, AK 99811; (907) 465-4685.

February 15-16. Building Construction: Noncombustible and Fire-Resistive (Alaska). For further information, contact: Fire Service Training, Adult and Continuing Education, Pouch F, State Office Building, Juneau, AK 99811; (907) 465-4685.

February 15-16. Interpersonal Relations for Fire Service Supervisors (Hawaii). For further information, contact: Honolulu Fire Department, Training Department, 1455 S. Beretania Street, Room 313, Honolulu, HI 96814; (808) 955-8139.

February 16-17. Fire Service Supervision (District of Columbia). For further information, contact: Training Academy, District of Columbia Fire Department, 4600 Overlook Avenue, SW, Washington, DC 20032; (202) 745-2245.

February 18-19. Building Construction: Wood and Ordinary (New Mexico). For further information, contact: New Mexico State Fire Marshal's Office, P.O. Drawer 1269, Santa Fe, NM 87501; (505) 827-2357.

February 18-19. Hazardous Materials Incident Analysis (Vermont). For further information, contact: Fire Service Training Program, Vermont State Firefighters Association, P.O. Box 53, Pittsford, VT 05763.

February 18-19. Interpersonal Relations for Fire Service Supervisors (Rhode Island). For further information, contact: Fire Science and Fire Service Training, Community College of Rhode Island, 25 Althea Drive, Cranston, RI 02920; (401) 781-6147.

February 25-26. Building Construction: Noncombustible and Fire Resistive (North Dakota). For further information, contact: North Dakota Firemen's Association, 176 First Avenue NE, Beach, ND 58621; (701) 872-4392.

February 25-26. Fire Fighting Resource Management Planning (North Dakota). For further information, contact: North Dakota Firemen's Association, 176 First Avenue NE, Beach, ND 58621; (701) 872-4392.

February 25-26. Fire Risk Analysis (North Dakota). For further information, contact: North Dakota Firemen's Association, 176 First Avenue NE, Beach, ND 58621; (701) 872-4392.

February 25-26. Incident Command System and Structural Fire Fighting (Arkansas). For further information, contact: Arkansas Fire Academy, Southwest Technical Institute, P.O. Box 3048, East Camden, AR 71071; (501) 574-1521.

February 25-26. Incident Command System and Structural Fire Fighting (North Dakota). For further information, contact: North Dakota Firemen's Association, 176 First Avenue NE, Beach, ND 58621; (701) 872-4392.

February 25-26. Interpersonal Relations for Fire Service Supervisors (Illinois). For further information, contact: Fire Service Institute, University of Illinois, 301 South Wright Street, Champaign, IL 61820; (217) 333-3800.

February 25-26. Interpersonal Relations for Fire Service Supervisors (Louisiana). For further information, contact: LSU Firemen Training Program, Pleasant Hall, Louisiana State University, Baton Rouge, LA 70803; (504) 766-0600.

March

March 3-4. Building Construction: Noncombustible and Fire-Resistive (Iowa). For further information, contact: Fire Service Extension, Fire Service Building, Iowa State University, Ames, IA 50011; (515) 294-6817.

March 3-4. Building Construction: Noncombustible and Fire-Resistive (Missouri). For further information, contact: Missouri Fire and Rescue Training Institute, 1001 Ashland Gravel Road, Columbia, MO 65201; (314) 882-4735.

March 3-4. EMS Administration (New Jersey). For further information, contact: New Jersey State Fire College, New Jersey State Safety Council, Inc., 50 Park Place, Suite 820, Newark, NJ 07192; (201) 642-3123.

March 3-4. Fire Apparatus Purchase and Maintenance (Kansas). For further information, contact: Fire Service Training, Division of Continuing Education, University of Kansas, 645 New Hampshire Avenue, Lawrence, KS 60045; (913) 864-4467.

March 3-4. Fire Apparatus Purchase and Maintenance (Tennessee). For further information, contact: Tennessee State Fire School, 1303 Old Fort Parkway, Murfreesboro, TN 37130; (615) 893-4095.

March 3-4. Fire Service Supervision (Iowa). For further information, contact: Fire Service Extension, Fire Service Building, Iowa State University, Ames, IA 50011; (515) 294-6817.

March 3-4. Fire Service Supervision (Maine). For further information, contact: Fire Service Training, Bureau of Vocational Education, Department of Education and Cultural Services, Station #23, Augusta, ME 04330; (207) 289-2621.

March 3-4. Fire Service Supervision (Montana). For further information, contact: Montana Fire Services Training School, 2100 16th Avenue South, Great Falls, MT 59405; (406) 761-7885.

March 3-4. Fire Service Supervision (North Carolina). For further information, contact: North Carolina State Fire Commission, 116 West Jones Street, P.O. Box 27687, Raleigh, NC 26711; (919) 733-6750.

March 3-4. Hazardous Materials Incident Analysis (Nevada). For further information, contact: Fire Service Training Section, State Fire Marshal Division, Capitol Complex, Carson City, NV 89710; (702) 885-4290.

March 3-4. Hazardous Materials Incident Analysis (New Jersey). For further information, contact: New Jersey State Fire College, New Jersey State Safety Council, Inc., 50 Park Place, Suite 820, Newark, NJ 07192; (201) 642-3123.

March 10-11. Building Construction: Wood and Ordinary (Indiana). For further information, contact: State Fire Marshal's Office, 502 State Office Building, 100 North Senate Street, Indianapolis, IN 46204; (317) 232-2222.

March 10-11. Fire Risk Analysis (Indiana). For further information, contact: State Fire Marshal's Office, 502 State Office Building, 100 North Senate Street, Indianapolis, IN 46204; (317) 232-2222.

March 10-11. Hazardous Materials Incident Analysis (Minnesota). For further information, contact: Adult Vocational Section, Minnesota Department of Education, 529 Capital Square Building, 550 Cedar Street, St. Paul, MN 55101; (612) 296-6516.

March 13-14. Building Construction: Noncombustible and Fire-Resistive (Mississippi). For further information, contact: Mississippi Fire Academy, Route 10, Box 295, Jackson, MS 39208; (601) 932-2444.

March 16-17. Interpersonal Relations for Fire Service Supervisors (Utah). For further information, contact: State Fire Service Training, Utah Technical College at Provo, P.O. Box 1609, Provo, UT 84601; (801) 226-5000, ext. 352.

March 17-18. Building Construction: Noncombustible and Fire-Resistive (Vermont). For further information, contact: Fire Service Training Program, Vermont State Firefighters Association, P.O. Box 53, Pittsford, VT 05763; (802) 483-9407.

March 17-18. Building Construction: Wood and Ordinary (Florida). For further information, contact: Fire Standards and Training, 1501 SW Broadway, Ocala, FL 32670; (904) 732-0526.

March 17-19. Fire Fighting Resource Management Planning (Washington). For further information, contact: Fire Service Training, Commission for Vocational Education, Airdustrial Park, Building 17, Mail Stop LS-10, Olympia, WA 98594; (206) 753-5679.

March 20-21. Fire Fighting Resource Management Planning (Alabama). For further information, contact: Alabama State Fire College, Shelton State Community College, 2015 McFarland Avenue East, Tuscaloosa, AL 35405; (205) 348-6241.

March 20-21. Fire Service Supervision (Massachusetts). For further information, contact: Massachusetts Firefighting Academy, 59 Horse Pond Road, Sudbury, MA 01776; (617) 443-8956.

March 24-25. Pesticide Fire and Spill Control (Nebraska). For further information, contact: Nebraska Fire Service, 3721 West Cuming, Lincoln, NE 68524-1896; (402) 471-2803.

March 31-April 1. Fire Fighting Resource Management Planning (Illinois). For further information, contact: Fire Service Institute, University of Illinois, 301 South Wright Street, Champaign, IL 61820; (217) 333-3800.

March 31-April 1. Interpersonal Relations for Fire Service Supervisors (Connecticut). For further information, contact: Fire Training and Education, Commission on Fire Prevention and Control, 294 Colony Street, Meriden, CT 06450; (203) 238-6587.

April

April 7-8. Building Construction: Wood and Ordinary (South Dakota). For further information, contact: Fire Service Training, 118 West Capital, Pierre, SD 57501; (605) 773-3876.

April 7-8. EMS Administration (New Hampshire). For further information, contact: New Hampshire Fire Standards and Training Commission, 18 Low Avenue, Concord, NH 03301; (603) 271-2661.

April 7-8. Fire Fighting Resource Management Planning (Maine). For further information, contact: Fire Service Training, Bureau of Vocational Education, Department of Education and Cultural Services, Station #23, Augusta, ME 04330; (207) 289-2621.

April 7-8. Fire Fighting Resource Management Planning (Maryland). For further information, contact: Maryland Fire and Rescue Institute, University of Maryland, College Park, MD 20742; (301) 454-2416.

April 7-8. Fire Service Supervision (New Hampshire). For further information, contact: New Hampshire Fire Standards and Training Commission, 18 Low Avenue, Concord, NH 03301; (603) 271-2661.

April 7-8. Fire Service Supervision (Wyoming). For further information, contact: Fire Training Officer, Fire Prevention and Electrical Safety, 506 West 17th Street, Cheyenne, WY 82002; (307) 777-7288.

April 7-8. Hazardous Materials Incident Analysis (Ohio). For further information, contact: Ohio Fire Academy, Ohio Division of State Fire Marshal, 8895 East Main Street, Reynoldsburg, OH 43068; (614) 864-5510.

April 7-8. Incident Command System and Structural Fire Fighting (Nebraska). For further information, contact: Nebraska Fire Service, 3721 West Cuming, Lincoln, NE 68524-1898; (402) 471-2803.

April 7-8. Interpersonal Relations for Fire Service Supervisors (Ohio). For further information, contact: Ohio Fire Academy, Ohio Division of State Fire Marshal, 8895 East Main Street, Reynoldsburg, OH 43068; (614) 864-5510.

April 13-15. Building Construction: Wood and Ordinary (Washington). For further information, contact: Fire Service Training, Commission for Vocational Education, Airdustrial Park, Building 17, Mail Stop LS-10; Olympia, WA 98594; (206) 753-5679.

April 13-15. Fire Risk Analysis (Washington). For further information, contact: Fire Service Training, Commission for Vocational Education, Airdustrial Park, Building 17, Mail Stop LS-10; Olympia, WA 98594; (206) 753-5679.

April 14-15. Fire Apparatus Purchase and Maintenance (North Carolina). For further information, contact: North Carolina State Fire Commission, 116 West Jones Street, P.O. Box 27687, Raleigh, NC 26711; (919) 733-6750.

April 14-15. Fire Fighting Resource Management Planning (Arkansas). For further information, contact: Arkansas Fire Academy, Southwest Technical Institute, P.O. Box 3048, East Camden, AR 71701; (501) 574-1521.

April 14-15. Fire Fighting Resource Management Planning (Michigan). For further information, contact: Michigan Firefighter's Training Council, 7150 Harris Drive, Lansing, MI 48913; (517) 322-1922.

April 14-15. Interpersonal Relations for Fire Service Supervisors (Michigan). For further information, contact: Michigan Firefighter's Training Council, 7150 Harris Drive, Lansing, MI 48913; (517) 322-1922.

April 14-15. Interpersonal Relations for Fire Service Supervisors (Oklahoma). For further information, contact: Fire Service Training, Fire Building, Oklahoma State University, Stillwater, OK 74078; (405) 624-5727.

April 28-29. Building Construction: Noncombustible and Fire-Resistive (Florida). For further information, contact: Fire Standards and Training, 1501 SW Broadway, Ocala, FL 32670; (904) 732-0526.

April 28-29. Building Construction: Noncombustible and Fire-Resistive (Louisiana). For further information, contact: LSU Fireman Training Program, Pleasant Hall, Louisiana State University, Baton Rouge, LA 70803; (504) 766-0600.

April 28-29. Fire Apparatus Purchase and Maintenance (Colorado). For further information, contact: Fire Service Training, 12600 West 6th Avenue, Golden, CO 80401; (303) 988-6160, ext. 320.

April 28-29. Fire Fighting Resource Management Planning (Rhode Island). For further information, contact: Fire Science and Fire Service Training, Community College of Rhode Island, 25 Althea Drive, Cranston, RI 02920; (401) 781-6147.

April 28-29. Hazardous Materials Incident Analysis (Montana). For further information, contact: Montana Fire Services Training School, 2100 16th Avenue South, Great Falls, MT 59405; (406) 761-7885.

April 30-May 1. Pesticide Fire and Spill Control (South Dakota). For further information, contact: Fire Service Training, 118 West Capital, Pierre, SD 57501; (605) 773-3876.

May

May 1-2. Fire Fighting Resource Management Planning (District of Columbia). For further information, contact: Training Academy, District of Columbia Fire Department, 4600 Overlook Avenue SW, Washington, DC 20032; (202) 745-2245.

May 2-3. Interpersonal Relations for Fire Service Supervisors (Alabama). For further information, contact: Alabama State Fire College, Shelton State Community College, 2015 McFarland Avenue East, Tuscaloosa, AL 35405; (205) 348-6241.

May 5-6. Building Construction: Noncombustible and Fire-Resistive (New Jersey). For further information, contact: New Jersey State Fire College, New Jersey State Safety Council, Inc., 50 Park Place, Suite 820, Newark, NJ 07102; (201) 642-3123.

May 5-6. Building Construction: Noncombustible and Fire-Resistive (Wisconsin). For further information, contact: Fire Education and Training, Wisconsin Board for Vocational, Technical, and Adult Education, 4802 Sheboygan Avenue, Room 701, P.O. Box 7874, Madison, WI 53702; (608) 266-7994.

May 5-6. Fire Fighting Resource Management Planning (Connecticut). For further information, contact: Fire Training and Education, Commission on Fire Prevention and Control, 294 Colony Street, Meriden, CT 06450; (203) 238-6587.

May 5-6. Fire Fighting Resource Management Planning (New Mexico). For further information, contact: New Mexico State Fire Marshal's Office, P.O. Drawer 1269, Santa Fe, NM 87501; (505) 827-2357.

May 5-6. Fire Fighting Resource Management Planning (Wyoming). For further information, contact: Fire Training Officer, Fire Prevention and Electrical Safety, 506 West 17th Street, Cheyenne, WY 82002; (307) 777-7288.

May 5-6. Fire Risk Analysis (Wisconsin). For further information, contact: Fire Education and Training, Wisconsin Board for Vocational, Technical, and Adult Education, 4802 Sheboygan Avenue, Room 701, P.O. Box 7874, Madison, WI 53702; (608) 266-7994.

May 5-6. Fire Service Supervision (New Jersey). For further information, contact: New Jersey State Fire College, New Jersey State Safety Council, Inc., 50 Park Place, Suite 820, Newark, NJ 07102; (201) 642-3123.

May 5-6. Incident Command System and Structural Fire Fighting (Nevada). For further information, contact: Fire Service Training Section, State Fire Marshal Division, Capitol Complex, Carson City, NV 89710; (702) 885-4290.

May 5-6. Incident Command System and Structural Fire Fighting (South Carolina). For further information, contact: South Carolina Fire Academy, State Board for Technical and Comprehensive Education, 2920 Fire Academy Road, West Columbia, SC 29169; (803) 758-8411.

May 12-13. Building Construction: Noncombustible and Fire-Resistive (New York). For further information, contact: Training and Education, Office of Fire Prevention and Control, New York State Department of State, 162 Washington Avenue, Albany, NY 12231; (518) 474-6746.

May 14-15. Fire Fighting Resource Management Planning (Alaska). For further information, contact: Fire Service Training, Adult and Continuing Education, Pouch F, State Office Building, Juneau, AK 99811; (907) 465-4685.

May 16-17. Fire Fighting Resource Management Planning (Massachusetts). For further information, contact: Massachusetts Firefighting Academy, 59 Horse Pond Road, Sudbury, MA 01776; (617) 443-8956.

May 19-20. Fire Apparatus Purchase and Maintenance (Virginia). For further information, contact: Department of Fire Programs, Commonwealth of Virginia, 2720 Enterprise Parkway, Suite 106, Richmond, VA 23229; (804) 281-9441.

May 19-20. Fire Service Supervision (West Virginia). For further information, contact: Fire Service Extension, West Virginia University, 313 Knapp Hall, Morgantown, WV 26506; (304) 293-2106.

May 19-20. Incident Command System and Structural Fire Fighting (North Carolina). For further information, contact: North Carolina State Fire Commission, 116 West Jones Street, P.O. Box 27687, Raleigh, NC 26711; (919) 733-6750.

May 19-20. Pesticide Fire and Spill Control (Virginia). For further information, contact: Department of Fire Programs, Commonwealth of Virginia, 2720 Enterprise Parkway, Suite 106, Richmond, VA 23229; (804) 281-9441.

May 21-22. Fire Risk Analysis (Hawaii). For further information, contact: Honolulu Fire Department, Training Department, 1455 Beretania Street, Room 313, Honolulu, HI 96814; (808) 955-8139.

June

June 2-3. Building Construction: Noncombustible and Fire-Resistive (Arizona). For further information, contact: Director of Fire Training, Arizona Division of Emergency Services, 5636 East McDowell Road, Phoenix, AZ 85008; (602) 273-9665.

June 2-3. Building Construction: Wood and Ordinary (Colorado). For further information, contact: Fire Service Training, 12600 West 6th Avenue, Golden, CO 80401; (303) 988-6160, ext. 320.

June 2-3. Fire Apparatus Purchase and Maintenance (Tennessee). For further information, contact: Tennessee State Fire School, 1303 Old Fort Parkway, Murfreesboro, TN 37130; (615) 893-4095.

June 2-3. Fire Fighting Resource Management Planning (Arizona). For further information, contact: Director of Fire Training, Arizona Division of Emergency Services, 5636 East McDowell Road, Phoenix, AZ 85008; (602) 273-9665.

June 2-3. Fire Risk Analysis (Arizona). For further information, contact: Director of Fire Training, Arizona Division of Emergency Services, 5636 East McDowell Road, Phoenix, AZ 85008; (602) 273-9665.

June 2-3. Fire Service Supervision (Arizona). For further information, contact: Director of Fire Training, Arizona Division of Emergency Services, 5636 East McDowell Road, Phoenix, AZ 85008; (602) 273-9665.

June 9-10. Fire Service Supervision (Georgia). For further information, contact: Georgia Fire Academy, 1112 Clay Street, Marietta, GA 30060; (404) 424-7315.

June 9-10. Incident Command System and Structural Fire Fighting (Florida). For further information, contact: Fire Standards and Training, 1501 SW Broadway, Ocala, FL 32670; (904) 732-0526.

June 16-17. Incident Command System and Structural Fire Fighting (Arkansas). For further information, contact: Arkansas Fire Academy, Southwest Technical Institute, P.O. Box 3048, East Camden, AR 71701; (501) 574-1521.

June 20-22. EMS Administration (Idaho). For further information, contact: Fire Service Training, C.S.I. Vo-Tech Center, P.O. Box 1238, Twin Falls, ID 83301; (208) 733-9554, ext. 328.

June 20-22. Fire Service Supervision (Idaho). For further information, contact: Fire Service Training, C.S.I. Vo-Tech Center, P.O. Box 1238, Twin Falls, ID 83301; (208) 733-9554, ext. 328.

June 20-22. Incident Command System (Idaho). For further information, contact: Fire Service Training, C.S.I. Vo-Tech Center, P.O. Box 1238, Twin Falls, ID 83301; (208) 733-9554, ext. 328.

June 20-22. Interpersonal Relations for Fire Service Supervisors (Idaho). For further information, contact: Fire Service Training, C.S.I. Vo-Tech Center, P.O. Box 1238, Twin Falls, ID 83301; (208) 733-9554, ext. 328.

June 25-26. Hazardous Materials Incident Analysis (Utah). For further information, contact: State Fire Service Training, Utah Technical College at Provo, P.O. Box 1609, Provo, UT 84601; (801) 226-5000, ext. 352.

July

July 28-29. Fire Fighting Resource Management Planning (West Virginia). For further information, contact: Fire Service Extension, West Virginia University, 313 Knapp Hall, Morgantown, WV 26506; (304) 293-2106.

August

August 4-5. Fire Service Supervision (Missouri). For further information, contact: Missouri Fire and Rescue Training Institute, 1001 Ashland Gravel Road, Columbia, MO 65201; (314) 882-4735.

August 4-5. Pesticide Fire and Spill Control (South Dakota). For further information, contact: Fire Service Training, 118 West Capital, Pierre, SD 57501; (605) 773-3876.

August 17-18. Fire Service Supervision (Utah). For further information, contact: State Fire Service Training, Utah Technical College at Provo, P.O. Box 1609, Provo, UT 84601; (801) 226-5000, ext. 352.

August 27-28. Fire Fighting Resource Management Planning (Hawaii). For further information, contact: Honolulu Fire Department, Training Department, 1455 S. Beretania Street, Room 313, Honolulu, HI 96814; (808) 955-8139.

September

September 1-2. EMS Administration (Minnesota). For further information, contact: Adult Vocational Section, Minnesota Department of Education, 529 Capital Square Building, 550 Cedar Street, St. Paul, MN 55101; (612) 296-6516.

September 8-9. Incident Command System and Structural Fire Fighting (Montana). For further information, contact: Montana Fire Services Training School, 2100 16th Avenue South, Great Falls, MT 59405; (406) 761-7885.

September 8-9. Interpersonal Relations for Fire Service Supervisors (Missouri). For further information, contact: Missouri Fire and Rescue Training Institute, 1001 Ashland Gravel Road, Columbia, MO 65201; (314) 882-4735.

September 15-16. Fire Risk Analysis (Wyoming). For further information, contact: Fire Training Officer, Fire Prevention and Electrical Safety, 506 West 17th Street, Cheyenne, WY 82002; (307) 777-7288.

September 15-16. Hazardous Materials Incident Analysis (Arkansas). For further information, contact: Arkansas Fire Academy, Southwest Technical Institute, P.O. Box 3048, East Camden, AR 71701; (501) 574-1521.

September 18-19. Building Construction: Noncombustible and Fire-Resistive (Texas). For further information, contact: Fire Protection Training, Texas Engineering Extension Service, Texas A & M University, FE Drawer K, College Station, TX 77843-8000; (409) 845-7641.

September 18-19. Fire Fighting Resource Management Planning (Texas). For further information, contact: Fire Protection Training, Texas Engineering Extension Service, Texas A & M University, FE Drawer K, College Station, TX 77843-8000; (409) 845-7641.

September 22-23. Building Construction: Noncombustible and Fire-Resistive (Washington). For further information, contact: Fire Service Training, Commission for Vocational Education, Airdustrial Park, Building 17, Mail Stop LS-10; Olympia, WA 98594; (206) 753-5679.

September 22-23. Fire Service Supervision (Florida). For further information, contact: Fire Standards and Training, 1501 SW Broadway, Ocala, FL 32670; (904) 732-0526.

September 22-23. Hazardous Materials Incident Analysis (West Virginia). For further information, contact: Fire Service Extension, West Virginia University, 313 Knapp Hall, Morgantown, WV 26506; (304) 293-2106.

September 29-30. Hazardous Materials Incident Analysis (Wyoming). For further information, contact: Fire Training Officer, Fire Prevention and Electrical Safety, 506 West 17th Street, Cheyenne, WY 82002; (307) 777-7288.

TYPICAL MEDICAL GAS CYLINDERS VOLUME AND WEIGHT OF AVAILABLE CONTENTS*

All Volumes at 70 F. (21.1 C)

Cylinder Style & Dimensions	Nominal Volume Cu In/Liter	Contents	NAME OF GAS								
			Air	Carbon Dioxide	Cyclo-Propane	Helium	Nitrogen	Nitrous Oxide	Oxygen	Mixtures of Oxygen	
										Helium	CO₂
B 3½" od x 13" 8.89 x 33 cm	87/1.43	psig		838	75				1900		
		Liters		370	375				200		
		Lbs.-Oz.		1 - 8	1 - 7¼				—		
		Kilograms		.68	.66				—		
D 4½" od x 17" 10.8 x 43 cm	176/2.88	psig	1900	838	75	1600	1900	745	1900	**	**
		Liters	375	940	870	300	370	940	400	300	400
		Lbs.-Oz.	—	3 - 13	3 - 5½	—	—	3 - 13	—	**	**
		Kilograms	—	1.73	1.51	—	—	1.73	—	**	**
E 4¼" od x 26" 10.8 x 66 cm	293/4.80	psig	1900	838		1600	1900	745	1900	**	**
		Liters	625	1,590		500	610	1,590	660	500	660
		Lbs.-Oz.	—	6 - 7		—	—	6 - 7	—	**	**
		Kilograms	—	2.92		—	—	2.92	—	**	**
M 7" od x 43" 17.8 x 109 cm	1337/21.9	psig	1900	838		1600	2200	7.45	2200	**	**
		Liters	2850	7,570		2260	3200	7,570	3450	2260	3000
		Lbs.-Oz.	—	30 - 10		—	—	30 - 10	122 cuft	**	**
		Kilograms	—	13.9		—	—	13.9	—	**	**
G 8½" od x 51" 21.6 x 130 cm	2370/38.8	psig	1900	838		1600		745		**	**
		Liters	5050	12,300		4000		13,800		4000	5330
		Lbs.-Oz.	—	50 - 0		—		56 - 0		**	**
		Kilograms	—	22.7		—		25.4		**	**
H or K 9¼" od x 51" 23.5 x 130 cm	2660/43.6	psig	2200			2200	2200	745	2200†		
		Liters	6550			6000	6400	15,800	6900		
		Lbs.-Oz.	—			—	—	64	244 cuft		
		Kilograms	—			—	—	29.1	—		

NOTES: (*) These are computed contents based on nominal cylinder volumes and rounded to no greater variance than ±1%.

(**) The pressure and weight of mixed gases will vary according to the composition of the mixture.

(†) 275 cu. ft./7800 liter cylinders at 2490 psig are available upon request.

WE WANT TO KNOW . . .

if a name, an address, or a phone number has changed; if there's an upcoming event, a new program or course, a new publication being offered. If you have more current information than is contained in this *Almanac*, know something that should be included in this book, or just have something interesting about the fire protection scene that you want to contribute, please let us know. Write: Editor, *Fire Almanac*, NFPA, Batterymarch Park, Quincy, MA 02269. All suggestions will receive our careful attention.

SAMPLES OF TYPICAL FIRE LOADS

Type of Room	Contents Fire Load psf	Standard Deviation psf
Living Room	3.9	1.13
Family Room	2.7	.65
Bedroom	4.3	1.15
Dining Room	3.6	1.02
Kitchen	3.2	.77
Hospital Patient Room	1.2	.36
Nursing Home Patient Room	2.6	.62

COLOR OF FLAME/TEMPERATURE

The color of smoke becomes darker with the presence of more hydrocarbons (gasoline, oil, etc.). The color of flame varies from red to yellow to white (colorless) with an increase in temperature.

Temperature	Color	Temperature	Color
900°F	Faint red	1650°F	Salmon
1050°F	Blood red	1725°F	Orange
1175°F	Dark cherry	1825°F	Lemon
1250°F	Medium cherry	1975°F	Light yellow
1375°F	Cherry	2200°F	White
1550°F	Bright red	2550°F	Blue white

SMOKE AND FLAME COLOR

The colors of smoke and flame are subject to considerable variation, but the following tabulation, based on fire department experience, may prove helpful.

Combustible	Color of Smoke	Color of Flame
Wood	Gray to Brown	Red to Yellow
Paper	Gray to Brown	Red to Yellow
Cloth	Gray to Brown	Red to Yellow
Gasoline	Black	Red to White
Naphtha	Brown to Black	Straw to White
Benzine	White to Gray	Yellow to White
Lubricating Oil	Black	Dark Red to Orange-Yellow
Lacquer Thinner	Brownish Black	Red to Yellow
Turpentine	Black to Brown	Yellow to White
Acetone	Black	Blue White
Cooking Oil	Brown	Red to Yellow
Kerosene	Black	Dark Red to Orange-Yellow

5-Year Chronological Calendar 1980-1984

1980

JANUARY

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FEBRUARY

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JANUARY

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FEBRUARY

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OCTOBER

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NOVEMBER

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DECEMBER

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JANUARY

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FEBRUARY

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JULY

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AUGUST

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OCTOBER

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DECEMBER

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FEBRUARY

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JULY

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OCTOBER

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NOVEMBER

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DECEMBER

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State Laws Governing Fireworks

The following table details current state laws governing the sale and use of Common (Class C) Fireworks, as these are defined by the U.S. Department of Transportation in Title 49, Code of Federal Regulations, Part 173.88. Permit requirements for public fireworks displays are also shown.

The level of control for each state is listed according to the following categories:

I — States which *ban* the sale and use of *all* Common Fireworks. (14)
II — States which only allow the sale and use of sparklers and "toy snakes." ("S" denotes sparklers only; "SS" denotes both sparklers and snakes.) (9)
III — States which allow the sale and use of only those common fireworks specifically defined by state law. (11 plus DC)
IV — States which allow the sale and use of only those common fireworks specifically approved by the enforcing authority of the state. (6)
V — States which allow the sale and use of all common fireworks. (8)
VI — States which have no fireworks control laws, except at county level. (2)

In addition to the above information, it would be noted that municipalities may have stricter laws.

Kentucky requires common fireworks specifically defined by law to be approved by the state fire marshal.

Licensing requirements in Nevada and Hawaii are at the county level, not state level.

State	Control Category	Allowed Sales Period	License for Sale	Public Display Permit
Alabama	V	All Year	Anyone who sells	SFM
Alaska	V	All Year	Wholesale/Retail	SFM
Arizona	I	—	—	Local
Arkansas	V	6-20 to 7-10 12-10 to 1-15	Wholesale/Retail	State Police
California	IV	6-28 to 7-6	Wholesale/Retail	SFM/Local
Colorado	II S	All Year	None	Local
Connecticut	I	—	Wholesale	SFM/Local/DPS
Delaware	I	—	—	DPS
District of Columbia	III	All Year	Wholesale/Retail	Fire Chief
Florida	II S	All Year	None	Local
Georgia	I	—	—	County
Hawaii	VI	All Year	Wholesale/Retail (County)	Local
Idaho	III	6-15 to 7-5	None	Local
Illinois	II S	All Year	?	Local
Indiana	III	All Year	None	SFM
Iowa	II SS	All Year	None	Local
Kansas	IV	6-27 to 7-5	None	Local
Kentucky	III	All Year	—	SFM/Local
Louisiana	V	6-25 to 7-5 12-15 to 1-1	Wholesale/Retail	Local
Maine	II S	All Year	None	SFM
Maryland	II S	All Year	None	SFM
Massachusetts	I	—	—	Local
Michigan	III	All Year	None	Local
Minnesota	I	—	—	Local

State	Control Category	Allowed Sales Period	License for Sale	Public Display Permit
Mississippi	V	6-15 to 7-5 12-5 to 1-2	None	Local
Missouri	V	6-20 to 7-10 12-10 to 1-5	None	Local
Montana	III	6-24 to 7-5	None	SFM/Local
Nebraska	IV	6-25 to 7-4	Wholesale/Retail	SFM
Nevada	IV	All Year	Wholesale/State Retail/(County)	County
New Hampshire	I	—	—	Local
New Jersey	I	—	—	Local
New Mexico	IV	All Year	None	Local
New York	I	—	—	Local
North Carolina	I	—	—	County
North Dakota	III	6-27 to 7-5	Wholesale/Retail	Local
Ohio	I	—	—	Local
Oklahoma	III	6-15 to 7-6 12-15 to 1-2	Wholesale/Retail	SFM
Oregon	II SS III	All Year 6-20 to 7-6	Wholesale/Retail	SFM/Local
Pennsylvania	II S	All Year	None	Local
Rhode Island	I	—	—	Local
South Carolina	III	All Year	Wholesale/Retail	Local
South Dakota	V	6-27 to 7-5	Wholesale/Retail	Local
Tennessee	V	6-20 to 7-5 12-10 to 1-2	Wholesale/Retail	SFM
Texas	III	6-24 to 7-4 12-15 to 1-1	Wholesale/Retail	SFM/Local
Utah	III S	All Year	None	Local
Vermont	I	—	—	Local
Virginia	III	All Year	None	Local
Washington	IV	6-28 to 7-6	Wholesale/Retail	Local/SFM
West Virginia	I	—	—	SFM/Local
Wisconsin	II SS	All Year	None	Local
Wyoming	III	All Year	None	Local

Notes: SFM - State Fire Marshal; ? - No information available; DPS - Dept of Public Safety; — - Does not apply

Fireworks Incidents

Each year, hundreds of persons are victims of fireworks through injuries, damage to property, and even death. Review of fire reports and fire experience data have shown that the majority of injuries due to fireworks occur to persons under the age of 19; males were more frequently the victims of these incidents. (See "Fireworks Incidents: The 1978 Story," *Fire Journal*, November 1978, Vol. 72, No. 6, p. 58, and "Fireworks Incidents and Injuries in California," *Fire Journal*, May 1983, Vol. 77, No. 3, p. 70.)

Devices such as bottle rockets, cherry bombs, M-80s, homemade bombs, firecrackers, even toy caps when used improperly or without supervision can cause serious injury and even death to the user of fireworks or to an innocent bystander. Many people have suffered second- and third-degree burns to the body, partial or total loss of sight, loss of hearing, dismemberment of fingers, loss of hands, etc.

The causes of fireworks incidents are varied: malfunctioning devices, children playing with fireworks without adult supervision; improper storage of fireworks; placement of fireworks inside glass bottles and other containers; fireworks landing on roofs, especially those constructed of wood shingles; and, an overall ignorance of the destructive and harmful capabilities of fireworks to self and others.

SELECTED FIREWORKS INCIDENTS 1978-83

Date	Location	Deaths	Injuries	Property Loss	Description
3/17/78	Wilmette, IL	1	9	$4,000,000	Several explosions in a clandestine fireworks factory.
6/5/79	Santa Clara County, CA	1			Fire caused by teenage boys discharging M-80 type fireworks, apparently igniting ground cover.
6/7/79	Walnut Creek, CA			$300,000	Grass fire caused by boys playing with firecrackers; high winds carried fire to nearby homes.
6/30/79	Bolingbrook, IL		2		Spark apparently dropped into open box of unused fireworks, igniting them.
7/3/79	Philadelphia, PA	3	7		Illegal fireworks factory in basement of duplex home exploded.
7/4/79	Oskaloosa, IA	1	14		Aerial device at public fireworks display failed to reach a safe height and fell into crowd before exploding.
7/4/79	Fresno, CA		1	$218,000	Bottle rockets landed on wooden roofing materials near motel, igniting them.
7/4/79	Kansas City, MO			$75,000	Bottle rocket apparently ignited wood-shingled roof of single-family dwelling.
7/4/79	Denton, TX			$50,000	Bottle rocket ignited wood-shingled roof of residence.
7/17/79	Delafield, WI			$200,000	Fireworks device set off by child playing in apartment building ignited straw on floor of building.
6/80	Laramie, WY	3			Explosion in an apparently illegal fireworks-manufacturing operation.
7/80	Texas			$933,000	Fireworks ignited wood-chingled roof in apartment complex.
7/30/80	San Diego, CA	3			Explosion at naval installation while confiscated fireworks were being moved from a munitions bunker to a pickup truck.
12/80	California		4		Sparkler ignited branch of Christmas tree during ceremony.
4/2/81	Newport, KY	2	27		Explosion in building apparently used to make or store fireworks.
1/1/82	Tupelo, MS	1			Fireworks thrown by child from car ignited in car.
5/31/82	Gratiot County, MI	2		$10,500	Materials apparently used to make fireworks exploded and touched off a fire in a garage.
6/28/82	Washington, DC		6		String of firecrackers exploded in shopping bag full of beer bottles, spraying glass throughout a crowded bus.
6/30/82	Omaha, NE		1		Person injured attempting to turn over firecracker that was already burning.
7/2/82	New Haven, CT		1	$24,000	An M-80 thrown onto second floor porch ignited exterior of home. One person suffered smoke inhalation in fire.

Date	Location	Deaths	Injuries	Property Loss	Description
7/3/82	Omaha, NE		1		Person standing over firecracker when it exploded.
7/3/82	Cookeville, TN		1		Roman candle exploded in person's right hand.
7/4/82	Kansas City, MO		1		Firecracker went off before being released from hand.
7/4/82	Boston, MA		1		Lit firecracker exploded, sending small rock into eye.
7/4/82	Somerville, MA		1		Bottle rocket struck person after being pointed at him.
7/4/82	Woodbridge, VA		1		Second-degree burns to hand after matches ignited while lighting sparklers.
7/4/82	Lakewood, OH		24		Fireworks stored for a major display exploded; sparks from an opening salute during Fourth of July celebration ignited other fireworks.
7/4/82	Port Jefferson, NY		1	$30,000	Bottle rocket thrown into gas tank in garage.
7/4/82	Houston, TX			$242,000	Bottle rocket ignited wood-shingled roof of an apartment building.
7/5/82	Houston, TX			$105,000	Fireworks ignited wood-shingled roof of a home, and fire spread to two nearby homes.
8/10/82	Seabrook, NH	4			Explosion in fireworks manufacturing plant.
7/5/83	Staten Island, NY	1			A 27-year old man packed M-80's into a 55-gal. drum and ignited them. He was killed by shrapnel.

Where To Find Out More

References and Other Sources

The selected publications listed below will provide the reader with additional information about many of the subjects covered in the *1983 Fire Almanac.*

The most general reference available on fire protection and prevention is the NFPA's *Fire Protection Handbook*, 15th edition.

Sources of information on U.S. federal agencies are: *Catalog of Federal Domestic Assistance, Commerce Business Daily, Congressional Record* and Federal Register. For information on these and practically all subjects write: Superintendent of Documents, Washington, DC 20402.

U.S. government research reports can be obtained from the following: HUD USER, P.O. Box 280, Germantown, MD 20767 (301) 251-5154; National Technical Information Service (NTIS), 5285 Port Royal Rd., Springfield, VA 22161 (703) 487-4650; Government Printing Office - Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402; Project Share: A National Clearinghouse for Improving Management of Human Services, P.O. Box 2309, Rockville, MD 20852 (301) 428-3100; Smithsonian Institution Science Information Exchange, 1730 M St., NW, Room 300, Washington, DC 20036 (202) 634-3933; National Criminal Justice Reference Service, Box 6000, Rockville, MD 20850 (301) 251-5500. All of the above organizations excluding the Government Printing Office will conduct computerized literature searches.

Specific References

Accident Prevention Manual for Industrial Operations (National Safety Council)
America Burning - National Commission on Fire Prevention and Control (U.S. Government Printing Office)
American Firehouse, An Architectural and Social History, The (Abbeville Press, Inc.)
Arson Investigation (Macmillan)
Computerized Approach for Identifying Cost-Effective Fire Safety Retrofits in Health Care Facilities, A (National Bureau of Standards, U.S. Dept. of Commerce)
Dangerous Properties of Industrial Materials (Van Nostrand Reinhold Company)
Educational Programs and Materials in Burn Care (American Burn Association)
Electrical Instruments in Hazardous Locations (Instrument Society of America)
Emergency Care (R.J. Brady)
Fire Aboard: The Problems of Prevention and Control in Ships, Port Installations and Offshore Structures (Simmons-Boardman Publishing Corp.)
Fire and Arson Investigation (Investigations Institute)
Fire Chief's Handbook (Fire Engineering)
Fire Fighting/Principles & Practices (Dun Donnelly Publishing Corp.)
Fire Department Deployment Analysis (North Holland)
Fire Loss Control: A Management Guide (Marcel Dekker, Inc.)
Fire Prevention (Nelson-Hall Chicago)
Firefighting in America, Dennis Smith's History of (The Dial Press)
Flammable Hazardous Materials (Glencoe Press Fire Science Series)
Forest Fire: Control and Use (McGraw-Hill)
Hazardous Material Spills, Control of (AICHE)
Hazardous Materials Guide (J. J. Keller & Associates, Inc.)
Hazardous Waste Management Guide (J.J. Keller & Associates, Inc.)
Hazardous Waste Regulatory Guide (J.J. Keller & Associates, Inc.)
Hazardous Waste Services Directory (J.J. Keller & Associates, Inc.)
Industrial Explosion Prevention and Protection (McGraw-Hill)
Municipal Year Book 1982, The (International City Management Association)
150 Years "From Buckets to Diesels" (27-33 Publicity Committee)
Reactive Chemical Hazards, Handbook of (Butterworths)
Residential Smoke and Fire Detector Coverage in the U.S.: Findings from a 1982 Survey (NTIS PB 83118885)
Safety Directory, Best's (1979) Vols I and II (A. M. Best Co.)
Uniform Fire Code Standards (International Conference of Building Officials)

The following publications are among those available from the National Fire Protection Association, Publications Sales Division, Batterymarch Park, Quincy, MA 02269; (617) 770-3500.

Chemicals for Forest Fire Fighting
Emergency Medical Services
Emergency Medical Services for Fire Departments
Fire Brigade Training Manual
Fire in America
Fire Prevention Planning & Leadership for Small Communities
Fire Protection Guide on Hazardous Materials
Fire Protection Reference Directory
Fire Safety Educator's Handbook
Fire Service and the Law
Fire Service Today™
Fire Technology®

Fire Terms
Flammable and Combustible Liquids Code Handbook
Industrial Fire Hazards Handbook
Introduction to Fire Protection Law
Learn Not to Burn Curriculum
Legal Insight: Court Decisions Affecting Paid and Volunteer Fire Officers and Fire Fighters
Life Safety Code® Handbook
Management in the Fire Service
National Electrical Code® Handbook
National Fire Codes®
NFPA Washington Report, The
SCBA - A Fire Service Guide to the Selection, Use, Care and Maintenance of Self-Contained Breathing Apparatus
Technical Bulletin About Fire
Telecommunications Systems: Principles & Practices for Rural and Forestry Fire Services

Melting, Boiling, and Ignition Temperatures of Pure Metals in Solid Form

(Because of the variations in available information, the values given must be considered as being approximate and for guidance only. Generally, if a metal melts and flows before burning, an ignition temperature can be determined. Values were obtained from publications shown in the Bibliography.)

	Temperature °F.		
Pure Metal	Melting Point	Boiling Point	Solid Metal Ignition
Aluminum	1,220	4,445	above 1832*
Barium	1,337	2,084	347*
Calcium	1,548	2,625	1,300
Hafnium	4,032	9,750	—
Iron	2,795	5,432	1,706*
Lithium	367	2,437	356
Magnesium	1,202	2,030	1,153
Plutonium	1,184	6,000	1,112
Potassium	144	1,400	156*S
Sodium	208	1,616	above 239
Strontium	1,425	2,102	1,328*
Thorium	3,353	8,132	932*
Titanium	3,140	5,900	2,900
Uranium	2,070	6,900	below 6900
Zinc	786	1,665	1,652*
Zirconium	3,326	6,470	2,552*

* Ignition in oxygen
S Spontaneous ignition in moist air

Standard Gages for Sheet Metal and Wire

American Institute of Steel Construction, Inc.

Name of Gage	United States Standard Gage*		The United States Steel Wire Gage	American or Brown & Sharpe Wire Gage	New Birmingham Standard Sheet & Hoop Gage	British Imperial or English Legal Standard Wire Gage	Birmingham or Stubs Iron Wire Gage
Principal Use	Uncoated Steel Sheets and Light Plates		Steel Wire except Music Wire	Nonferrous Sheets and Wire	Iron and Steel Sheets and Hoops	Wire	Strips, Bands, Hoops and Wire
Gage No.	Weight (oz per sq ft)	Approx. Thickness (inches)	Thickness (inches)				
7/0's			0.4900		0.6666	0.500	
6/0's			0.4615	0.5800	0.6250	0.464	
5/0's			0.4305	0.5165	0.5883	0.432	0.500
4/0's			0.3938	0.4600	0.5416	0.400	0.454
3/0's			0.3625	0.4096	0.5000	0.372	0.425
2/0's			0.3310	0.3648	0.4452	0.348	0.380
0			0.3065	0.3249	0.3964	0.324	0.340
1			0.2830	0.2893	0.3532	0.300	0.300
2			0.2625	0.2576	0.3147	0.276	0.284
3	160	0.2391	0.2437	0.2294	0.2804	0.252	0.259
4	150	0.2242	0.2253	0.2043	0.2500	0.232	0.238
5	140	0.2092	0.2070	0.1819	0.2225	0.212	0.220
6	130	0.1943	0.1920	0.1620	0.1981	0.192	0.203
7	120	0.1793	0.1770	0.1443	0.1764	0.176	0.180
8	110	0.1644	0.1620	0.1285	0.1570	0.160	0.165
9	100	0.1495	0.1483	0.1144	0.1398	0.144	0.148
10	90	0.1345	0.1350	0.1019	0.1250	0.128	0.134
11	80	0.1196	0.1205	0.0907	0.1113	0.116	0.120
12	70	0.1046	0.1055	0.0808	0.0991	0.104	0.109
13	60	0.0897	0.0915	0.0720	0.0882	0.092	0.095
14	50	0.0747	0.0800	0.0641	0.0785	0.080	0.083
15	45	0.0673	0.0720	0.0571	0.0699	0.072	0.072
16	40	0.0598	0.0625	0.0508	0.0625	0.064	0.065
17	36	0.0538	0.0540	0.0453	0.0556	0.056	0.058

18	32	0.0478	0.0475	0.0403	0.0495	0.048	0.049
19	28	0.0418	0.0410	0.0359	0.0440	0.040	0.042
20	24	0.0359	0.0348	0.0320	0.0392	0.036	0.035
21	22	0.0329	0.0318	0.0285	0.0349	0.032	0.032
22	20	0.0299	0.0286	0.0253	0.0313	0.028	0.028
23	18	0.0269	0.0258	0.0226	0.0278	0.024	0.025
24	16	0.0239	0.0230	0.0201	0.0248	0.022	0.022
25	14	0.0209	0.0204	0.0179	0.0220	0.020	0.020
26	12	0.0179	0.0181	0.0159	0.0196	0.018	0.018
27	11	0.0164	0.0173	0.0142	0.0175	0.0164	0.016
28	10	0.0149	0.0162	0.0126	0.0156	0.0148	0.014
29	9	0.0135	0.0150	0.0113	0.0139	0.0136	0.013
30	8	0.0120	0.0140	0.0100	0.0123	0.0124	0.012
31	7	0.0105	0.0132	0.0089	0.0110	0.0116	0.010
32	6.5	0.0097	0.0128	0.0080	0.0098	0.0108	0.009
33	6	0.0090	0.0118	0.0071	0.0087	0.0100	0.008
34	5.5	0.0082	0.0104	0.0063	0.0077	0.0092	0.007
35	5	0.0075	0.0095	0.0056	0.0069	0.0084	0.005
36	4.5	0.0067	0.0090	0.0050	0.0061	0.0076	0.004
37	4.25	0.0064	0.0085	0.0045	0.0054	0.0068	
38	4	0.0060	0.0080	0.0040	0.0048	0.0060	
39			0.0075	0.0035	0.0043	0.0052	
40			0.0070	0.0031	0.0039	0.0048	

* U.S. Standard Gage is officially a weight gage, in oz per sq ft as tabulated. The Approx. Thickness shown is the "Manufacturers' Standard" of the American Iron and Steel Institute, based on steel as weighing 501.81 lbs per cu ft (489.6 true weight plus 2.5 percent for average over-run in area and thickness). The A.I.S.I. standard nomenclature for flat rolled carbon steel is as follows:

Widths, Inches	Thicknesses, Inch							
	0.2500 and thicker	0.2499 to 0.2031	0.2030 to 0.1875	0.1874 to 0.0568	0.0567 to 0.0344	0.0343 to 0.0255	0.0254 to 0.0142	0.0141 and thinner
To 3½ incl.	Bar	Bar	Strip	Strip	Strip	Strip	Sheet	Sheet
Over 3½ to 6 incl.	Bar	Bar	Strip	Strip	Strip	Sheet	Sheet	Sheet
Over 6 to 12 incl.	Plate	Strip	Strip	Strip	Sheet	Sheet	Sheet	Sheet
Over 12 to 32 incl.	Plate	Sheet	Sheet	Sheet	Sheet	Sheet	Sheet	Black Plate
Over 32 to 48 incl.	Plate	Sheet	Sheet	Sheet	Sheet	Sheet	Sheet	Sheet
Over 48	Plate	Plate	Plate	Sheet	Sheet	Sheet	Sheet	—

Capacity of Cylinders or Cylindrical Tanks

U.S. Gallons and Barrels (Petroleum) per Foot of Length or Height

Capacity per foot, U.S. gallons $= \frac{\pi D^2}{4} \times 7.481$

D = Inside diameter in feet

For capacity in barrels (petroleum), divide by 42

Diameter, ft	Capacity per ft Gals	Capacity per ft Bbls	Diameter, ft	Capacity per ft Gals	Capacity per ft Bbls	Diameter, ft	Capacity per ft Gals	Capacity per ft Bbls
1	5.8751	0.13989	51	15277.3	363.826	101	59932.6	1426.91
2	23.5007	0.55981	52	15[illegible]93.9	378.235	102	61125.3	1455.30
3	52.8766	1.258	53	16503.3	392.921	103	62329.7	1483.98
4	94.0029	2.2389	54	17131.9	407.888	104	63549.5	1512.94
5	146.879	3.49699	55	17792.4	423.135	105	64773.7	1542.17
6	211.506	5.03565	56	18424.5	438.662	106	66013.4	1571.68
7	287.883	6.85409	57	19088.4	454.468	107	67264.8	1601.48
8	376.011	8.95228	58	19764.1	470.554	108	68528.0	1631.55
9	475.889	11.3302	59	20451.5	486.920	109	69802.9	1661.90
10	587.517	13.9879	60	21150.6	503.565	110	71089.5	1692.54
11	710.892	16.9254	61	21861.5	520.491	111	72387.9	1723.45
12	846.022	20.1425	62	22584.2	537.696	112	73698.1	1754.64
13	992.902	23.6396	63	23318.6	555.182	113	75019.7	1786.12
14	1151.53	27.4164	64	24064.7	572.946	114	76353.5	1817.87
15	1321.92	31.4729	65	24822.6	590.991	115	77699.2	1849.90
16	1504.04	35.8091	66	25592.2	609.314	116	79056.2	1882.21
17	1697.92	40.425	67	26373.6	627.918	117	80425.1	1914.80
18	1903.56	45.3209	68	27166.8	646.802	118	81805.9	1947.68
19	2120.94	50.4965	69	27971.7	665.966	119	83198.1	1980.83
20	2350.07	55.9517	70	28788.3	685.409	120	84602.2	2014.26

21	2590.95	61.6868	71	29616.7	705.132	121	86018.3	2047.97
22	2843.58	67.7016	72	30456.9	725.134	122	87438.8	2081.97
23	3107.89	73.9963	73	31308.8	745.418	123	88885.5	2116.24
24	3384.02	80.5704	74	32172.4	765.980	124	90261.9	2150.79
25	3671.98	87.4247	75	33047.8	786.821	125	91799.2	2185.61
26	3971.69	94.5584	76	33935.0	807.944	126	93274.4	2220.73
27	4283.00	101.972	77	34833.9	829.346	127	94760.7	2256.12
28	4606.13	109.665	78	35744.5	851.026	128	96259.1	2291.79
29	4941.02	117.638	79	36666.9	872.987	129	97768.6	2327.73
30	5286.36	125.891	80	37601.1	895.228	130	99290.2	2363.96
31	5646.04	134.424	81	38547.0	917.749	131	100824	2400.45
32	6016.18	143.237	82	39504.6	940.549	132	102369	2437.26
33	6398.06	152.328	83	40474.1	963.630	133	103927	2474.33
34	6791.70	161.701	84	41455.2	986.989	134	105495	2511.67
35	7197.09	171.352	85	42448.1	1010.63	135	107075	2549.31
36	7614.25	181.284	86	43452.7	1034.55	136	108667	2587.21
37	8043.11	191.494	87	44469.2	1058.75	137	110271	2625.39
38	8483.71	201.984	88	45497.3	1083.23	138	111887	2663.86
39	8936.13	212.756	89	46537.2	1107.99	139	113514	2702.61
40	9400.30	223.807	90	47588.9	1133.02	140	115153	2741.64
41	9876.13	235.136	91	48652.3	1158.34	141	116804	2780.94
42	10363.8	246.747	92	49727.4	1183.94	142	118467	2820.53
43	10863.2	258.636	93	50814.4	1209.82	143	120141	2860.39
44	11374.3	270.806	94	51913.1	1235.79	144	121827	2900.53
45	11897.2	283.256	95	53023.4	1262.41	145	123525	2940.97
46	12431.8	295.984	96	54145.6	1289.13	146	125235	2981.66
47	12978.2	308.992	97	55280.1	1316.14	147	126957	3022.66
48	13536.4	322.283	98	56425.1	1343.40	148	128690	3063.93
49	14106.3	335.850	99	57582.6	1370.96	149	130434	3105.46
50	14688.0	349.699	100	58751.7	1398.79	150	132192	3147.29

Sizes and Capacity of Steel Pipe

Nominal Pipe Size (inches)	Outside Diameter (inches)	Inside Diameter (inches)	Capacity of One Foot Length of Pipe	
			Cubic Feet	Gallons
Schedule 40 Pipe				
½	0.840	0.622	0.0021	0.0158
¾	1.050	0.824	0.0037	0.0276
1	1.315	1.049	0.0060	0.0449
1¼	1.660	1.380	0.0104	0.0774
1½	1.900	1.610	0.0142	0.106
2	2.375	2.067	0.0233	0.174
2½	2.875	2.469	0.0332	0.248
3	3.500	3.068	0.0513	0.383
3½	4.000	3.548	0.0686	0.513
4	4.500	4.026	0.0883	0.660
5	5.563	5.047	0.139	1.04
6	6.625	6.065	0.200	1.50
8	8.625	7.981	0.3474	2.60
10	10.75	10.020	0.5475	4.10
12	12.75	11.938	0.7773	5.82
14	14.0	13.126	0.9397	7.03
16	16.0	15.000	1.2272	9.16
18	18.0	16.876	1.5533	11.61
20	20.0	18.814	1.9305	14.44
24	24.0	22.626	2.7920	20.87

Nominal Pipe Size (inches)	Outside Diameter (inches)	Inside Diameter (inches)	Capacity of One Foot Length of Pipe	
			Cubic Feet	Gallons
Schedule 80 Pipe				
½	0.840	0.546	0.0016	0.012
¾	1.050	0.742	0.0030	0.022
1	1.315	0.957	0.0050	0.037
1¼	1.660	1.278	0.0089	0.066
1½	1.900	1.500	0.0123	0.092
2	2.375	1.939	0.0205	0.153
2½	2.875	2.323	0.0294	0.220
3	3.500	2.900	0.0548	0.344
3½	4.000	3.364	0.0617	0.458
4	4.500	3.826	0.0798	0.597
5	5.563	4.813	0.126	0.947
6	6.625	5.761	0.181	1.35
8	8.625	7.625	0.3171	2.38
10	10.75	9.564	0.4989	3.74
12	12.75	11.376	0.7058	5.28
14	14.0	12.500	0.8522	6.38
16	16.0	14.314	1.1175	8.36
18	18.0	16.126	1.4183	10.61
20	20.0	17.938	1.7550	13.13
24	24.0	21.564	2.536	19.0

Average Amounts of Combustibles Per Sq Ft of Floor Area

(Contents, finished flooring, interior finish, and trim)*

Occupancy	Percent of Total Floor Area	Range of Combustible Contents, lbs per sq ft	Occupancy	Percent of Total Floor Area	Range of Combustible Contents, lbs per sq ft

Printing plant	36.7	0.0– 14.9
	27.8	15.0– 49.9
	35.5	50.0–100 +
Newspaper plant	67.6	0.0– 14.9
	30.2	15.0– 49.9
	2.2	50.0–100
Department store A	12.6	0.0– 4.9
	76.6	5.0– 14.9
	10.8	15.0– 40 +
Department store B	7.8	0.0– 4.9
	78.4	5.0– 14.9
	13.8	15.0– 40 +
Clothing factory A	35.3	0.0– 9.9
	53.6	10.0– 14.9
	11.1	15.0– 30
Clothing factory B	85.7	0.0– 9.9
	5.7	10.0– 14.9
	8.6	15.0– 40
Mattress factory A	10.8	0.0– 4.9
	67.1	5.0– 14.9
	22.1	15.0– 50
Mattress factory B	7.9	0.0– 4.9
	46.3	5.0– 14.9
	45.8	15.0–100 +
Furniture factory A	1.5	0.0– 9.9
	81.4	10.0– 29.9
	17.1	30.0– 65 +
Furniture factory B	54.7	0.0– 9.9
	37.3	10.0– 29.9
	8.0	30.0– 65 +
Warehouse A	86.3	0.0– 29.9
	13.7	30.0– 75
Warehouse B	18.1	0.0– 29.9
	50.9	30.0– 74.9
	31.0	75.0–257
Elementary school A (public)	99.2	0.0– 14.9
	0.8	15.0– 75
Elementary school B (public)	100.0	0.0– 15
High school A (public)	66.4	0.0– 4.9
	25.4	5.0– 9.9
	8.2	10.0–288†
High school B (public)	32.6	0.0– 4.9
	64.1	5.0– 9.9
	3.3	10.0–256‡
Offices	59.2	0.0– 14.9
	19.2	15.0– 29.9
	21.6	30.0– 86
Hospital (medical and surgical building)	82.1	0.0– 4.9
	17.0	5.0– 14.9
	.9	15.0– 20 +
Apartments (average of 13 units)	100.0	10.0

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* Data from National Bureau of Standards, BMS 92 (1942) and BMS 149 (1957).

† Includes fire loading for storage areas: 25 percent of floor area ranging from 25 to 100 lbs per sq ft (general storage) and 0.2 percent at 288 lbs per sq ft (textbook storage).

‡ Includes 0.3 percent of floor area at 256 lbs per sq ft (textbook storage).

PROPERTIES OF MATERIALS

	Flash Point °F	Ignition Temperature °F	Melting Point °F
Wood			
Western red cedar		378	
White pine		507	
White oak		410	
Paper birch		399	
Spruce		502	
Douglas fir		500	
Paper			
Newsprint		466	
Plastics			
Cellulose Acetate		698-824	
Polyvinylchloride (PVC)		752-1220	
Polyurethene		734-1022	
Styrene		824-1040	
Fabrics			
Cotton		464	
Nylon		887	293-489
Rayon		536	
Wool		401	
Metals			
Aluminum			1220
Brass			1570-1900
Bronze			1290-1890
Cast iron			2000-2800
Chromium			2930
Copper			1981
Iron			2802
Lead			621
Magnesium			1203
Nickel			2651
Platinum			3224
Silver			1761
Solder			361-482
Stainless steel			2462-2822
Steel			2552-2882
Tin			449
Zinc			786
Flammable Liquids			
Ethyl alcohol	55	793	
Ethyl ether	-49	356	
Gasoline	-45	536	
Methyl alcohol	52	867	
Methyl ethyl ketone	21	960	
Naptha, Safety Solvent	138	453	
Napthalene	174	979	
Toluol	40	997	
Turpentine	95	488	
Xylene	81-90	867-984	

	Flash Point °F	Ignition Temperature °F	Melting Point °F
Flammable Gas			
Ammonia (Anhydrous)		1200	
Butane		761	
Carbon Monoxide		1128	
Hydrogen		932	
Hydrogen Sulfide		500	
Methane		999	
Natural gas		900-1170	
Propane		871	
Miscellaneous			
Asphalt	400+	905	
Cooking oil	395	833	
Paraffin Wax	390	473	120-167
Transformer oil	295		
Tallow	509		88-100
Antifreeze (Propylene Glycol)	210	790	
Kerosene	100	444	
Glass	Softens	2000-2100	1400-1600

NOTES:

at 600°F Wood ignites in 5 minutes
at 500°F Wood ignites in 10 minutes
at 425°F Wood ignites in 20 minutes
at 375°F Wood ignites in 30 minutes

Factors which affect the burning of wood are the intensity of the fire and the density of the wood. Hard woods will not char as deeply as softer woods under the same fire conditions and in the same amount of time. It is generally considered that most woods burning under normal circumstances will burn about 1 inch in depth in 45 minutes.

Miscellaneous Information

Unprotected steel fails at 1000°F to 1400°F. Heated to 1000°F, a steel member will expand 9 ½ inches in 100 feet of length.

Glass has no definite melting point, but softens between 1400°F-1600°F.

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